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PHILOSOPHY AND SCIENCE.*

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It is certainly a great pleasure to me, Mr. President, and members of the Science Association, to have been invited to address your body. At the same time, it is not out of place to say that I hardly know why you should have asked me to speak. For I suppose you are already pretty well aware of what I shall say: you are quite familiar, all of you, with my views. Perhaps you were anxious to draw the enemy into your camp, take him prisoner there, and put him to torture. Well, I am quite willing. I shall say, as clearly as I can, what seems to me the truth about the evening's subject, hoping to get through in abundant time for any of you to attack my views if you wish to attack, or to confess yourselves convinced if you are convinced.

It may be well to notice that the printer has been cutting some capers, and so your circular indicates that I am to speak on *two* subjects — awhile on Philosophy, and then awhile on Science. Let me at once quiet any alarm you may feel at this suggested double dose. We have but one subject before us, and that is, *The Relation between Philosophy and Science*.

Of course, members of the Association have their favorite view of that relation. My decided impression is

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that most men of science are strongly persuaded that science is the only entirely good thing, the standard for everything else. To be sure, domestic bliss, friendship, poetry, and things of that sort, including even religion, they will admit are all good; but the highest good is intelligent good, and when it comes to a question of intelligence, they at least plainly hint there is nothing fully intelligent but science. But there the friends of philosophy will certainly "rise to explain." They challenge the claim of such scientific people as make it, that science must be the supreme regulative and that philosophy must take its orders from science.

I.

In undertaking to make clear our somewhat opposing philosophical view, I shall ask you to attend, first of all, to the serious ambiguity in that word "science." If science simply meant all that is unconditionally certain, or even everything that is least uncertain,—and once it did mean that, and it still means so, sometimes,—then it would of course be the only best thing. But if, going beyond this, one were to say that the only thing certain is the knowledge of Nature, the knowledge by actual experience, as contrasted with the knowledge of Spirit, which is only the object of thought, and that science must be restricted to signify the knowledge of Nature, then surely science would not be the best thing, and its glorifiers would besides be asserting a much disputed proposition in the theory of knowledge,—which is a province of philosophy. The man of science, as he most fills the modern eye, confessedly deals with phenomena only, with reality that is only derivative and relative; the philosopher hopes, on the contrary, to deal with absolute reality. Moreover, if you use the word "science" in the old Greek sense, to signify all that is absolutely certain, philosophy is by the judgment of its experts a part of science. Indeed, it used to be called the "science of sciences." Somehow or other a sad fate has

befallen it, had already befallen it before the day of Kant, who said that an attempt must be made to restore it, if possible, to its lost place of honor. *Modo maxima rerum, tot generis natisque potens, nunc trahor exul, inops*,—such, he declared, is the wail of the Hecuba of philosophy: once queen of the world, she has sunk to the lowest estate. Most of you probably have just that feeling about her. You have a certain sort of kindly but sorrowing respect, akin to pity, for us who give up our time to her:—why should so much toil and talent be thrown away on a being who, as one of our most honored scientific colleagues has said, is "at most a vast interrogation-point"? This kindly condescension and sympathy voices the assumption that philosophy and science are sharply contrasted things and mutually excludent, not affiliated parts of one whole knowledge: science, it is assumed, deals with ascertainable evidence; philosophy, only with conjectures and with dreams. The philosopher, for his part, smiles at this patronizing self-satisfaction, and holds to his own course. And thus the disputatious or disdainful dissent goes on, and a harmful chasm in academic life remains.

Now, we cannot settle any such question as that of the respective claims of two things so diversely esteemed, without knowing, as exactly as we may, what each of the things actually means. And of course, nowadays, we shall have to abandon that old and grander meaning of science. Science, in the usage now current, does not mean all that is certain, the strictly unquestionable,—*pure* knowledge, free from the dross of error and dubiety. It has come to mean knowledge such as not even men of science themselves claim to be absolutely certain; on the contrary, they call it a *tentative* knowledge, that is, merely the best assurance practicable; and this, moreover, not sought *in general*, not over all conceivable being, but in a very specific field, to-wit, the field of Nature. Science now means, in short, the knowledge of Nature, as attainable through the hesitant methods by which it is supposed Nature has to be known.

II.

But while we may agree to restrict science in this way, we still ought to observe that there are two very different conditions or stages of it. There is an old distinction that has gone a little out of vogue,—I mean the contrast between exact and inexact science,—and it seems to me that we shall gain if we refuse to discard it: we shall attain a more critical valuation of the different sciences. Thus, mathematics is an exact science; the fundamental part of physics is also exact. This formerly meant, and still should mean, that both possess a method of perfect and unqualified certainty; that both attain to the knowledge of real *law*, demonstrable and apodictic, literally universal and strictly necessary. And it is worth while further to discriminate an exact science from an inexact one by the fact that it can be treated by mathematical methods: science that has not yet arrived at a stage where it can be dealt with by mathematical methods is not exact. Accordingly, the sciences of natural history, in their present condition, are not exact.* Certain aspects of geology, to be sure, may within restricted limits be subjected to mathematical discussion, but still how very confined is the application of mathematics, even in this most developed part of natural history. When we come to the other natural history sciences, the case is still stronger: zoology and botany are not yet capable of any appreciable treatment by mathematics, so far as their own proper problems are concerned; perhaps they never will be. How different their case from that of physics; above all, how disparate from that of astronomy. This exact character of mathematics, and the dependence of the other sciences upon it for such partial exactitude as they have, is a fact of the

*I am entirely aware, of course, that this whole distinction of exact from inexact sciences is now often denied by scientific men: see, for a classical expression of the denial, Professor Huxley's address on "The Educational Value of the Natural History Sciences," in his *Collected Essays*, vol iii. Readers must understand that what follows in the present text is my reply to the denial.

greatest significance, and though it has of late been much neglected, and even disowned, we ought never to forget it, especially in the context of the comparative claims of science and philosophy; for mathematics, as the type and standard of scientific certainty, is the basis of a kindred between science and philosophy, and, when its method is not misunderstood, is at least the partial justification of philosophy against the charges brought against it by certain scientific men. It supplies an unanswerable example of the power of thought, pure *thought*, to attain absolute judgments that are still objective, and that even penetrate, as we shall later see, to the realm of absolute being. It is thus, when known in its real nature, a standing refutation of the agnostic.

Within recent years, however, the old conception of the superiority of the mathematical sciences has in the public imagination given way. The natural history sciences have undoubtedly taken the commanding place in the general esteem. And this has resulted in emphasizing their peculiar method, so diverse from the mathematical,—their method of observation and experiment. The method of natural history has thus come to be valued more highly in the current judgment than the method of mathematics; nay, the mathematical method has itself been professedly reduced to that of natural history; this in great part accounts for the corresponding disesteem of philosophy, at least of the higher sort. And yet something is to be said in behalf of this change. Mathematics is indispensable, to be sure, but how special and how pallid its sphere is,—number and shape, extent, duration, motion, direction, abstract relation. In contrast, by observation, experiment, and induction we undertake to find out the laws of change in the whole vast and thrilling *real* world—the world of color, odor, warmth, life, growth, feeling, sentiment, thought itself. Then, too, so prodigious have the successes of this method recently been, it is not greatly to be wondered at if men's minds have been taken captive by them. And

let it here go on record, that no one occupied with philosophy has, or can have, anything to say against science, even when taken in this lessened and lowered sense. He must—he does—admit the value of scientific method, be this mathematical or be it inductive; he must repose trustfully upon the judgment of the experts in this method who bring to him the results of their investigation. As to the reality of the value of science, the philosopher does not differ from the sober scientific man.

III.

But what now is the real ground for the value of science, regarded as the study of natural things, things spatial and things temporal,—the study of phenomena? Science taken in this sense, let us remember, has no concern with absolute existences. She takes up only the relative existences that present themselves historically—that is, changefully—in our experience, and endeavors by observation and experiment to find out all she can about them; ultimately, however, her object is to find the *laws* of change. Well, the object of knowing law is to base action upon it: if we were not beings of action, we should never have any serious interest in science; and the same is true in the case of philosophy. I know it is frequently said, and with a lofty emphasis, that we ought to pursue truth for its own sake, without the least reference to what it will do for us; but it really seems to me that to act so would be as nearly a proof of irrationality as a person could give. Of course it is our duty to find out the truth, for we cannot act rationally without it; but if it were shown that the truth when known could never be used, we would as rational beings inevitably abandon the search for it,—so deep-seated in the heart and intelligence of man, whether he be aware of it or not, is the conviction that he, that is, actively intelligent being, is the end of all things. His intelligence may perchance not be able to compass and positively define or depict its own nature and proper object,—that is a question for philosophy

itself to decide; but the nature and aims of that intelligence certainly cannot be summed up in the recognition of things merely natural and the laws that connect their changes.

Yet whatever the main and proper object of man's intelligence is, however infinite it may be, and thence inexhaustible by his understanding, he must achieve all the science of Nature, if but for the furtherance of that supreme object as his quickening aim: the knowledge of things natural is no doubt indispensable, since we have a natural life. But it is not sufficient or ultimate; it is merely a means to our higher life. This is why we who are given to philosophy in its higher ranges are of the conviction that philosophy is the supreme thing, and that science is secondary: we conclude that the relation of science to philosophy is that of means to end—that of subordination and auxiliary service. Philosophy holds the standard of values, and science gets its value *derivatively*,—because it is auxiliary to the essential human aim which philosophy has for chief object of study.

Still, it is just at this point that discussion comes in—as to whether there *is* any such supreme object of human nature as I am implying. And the struggle between culture and science in university organization also comes there. So I may restate the preceding position in terms of that fact:—I am implying that there *is* such a thing as pure culture, a participation in the life of the *homo humanior*, and that all the natural-scientific uses of intelligence are consequently subsidiary and subordinate. Thus I hold it solid truth to say that literature, the whole of the *litterae humaniores*, as the utterance and record of this *humanitas vera*, is necessarily richer and deeper than science can possibly be; and that, for culture, the richest and deepest thing of all must be philosophy, which is the direct effort to master the essence and compass of that *humanitas* itself. I therefore place philosophy at the determining summit of the disciplines in a truly organized university. This is an old-fashioned notion, you likely may say; but it can be shown true, nevertheless. The great historic founders of

universities had no other conception, and it still holds good in the historic universities of Europe. We in America have gone astray from this view because we have been so occupied in doing the kind of work so indispensable for the external support of culture.

There can be no question that this work is necessary, of course. Science, therefore, is not an unimportant thing; next to culture, it is the most important thing. But, I insist, it is *only* of next importance, for it is impossible that the true human nature can have its wants supplied from the world of bare things. And let us say, once more, that the modern meaning of science is just that: it is the study of mere things. Even psychology, as a *science*,—the "new" sort,—is a study only of things, a study of phenomena simply. Of course, I am now speaking of psychology in an accommodative sense, that is, as the study of mental *presentations*,—mental occurrences, states, and changes, not of the changeless intelligence itself. Psychology of this sort, observational psychology, is a study not of spirit, not of mind as mind, but of certain phenomena which we call psychical as opposed to physical. Thus the study that was once the very darling of philosophy has come to be, and to boast of being, only a natural science: it relates itself by preference with biology and physiology, and would like to appear as an advanced department of chemistry and physics. And people have come in recent times to rate even mathematics as merely a natural science. In our University, the College of Natural Sciences makes a very special point of teaching mathematics, as if this science were its chief property. So sweeping is the drift to this lowered conception of the nature and scope of science.

IV.

But *is* mathematics merely a natural science? Kant so regarded it, and ever since Kant's time it has been held to be such; yet I am sure that this is one of Kant's few but fatal

mistakes. This I now need to make clear to you, as bearing very weightily on our question of the relation between science and philosophy.

Mathematics is divisible into two great branches: the Theory of Number, and the Theory of Figure, or Geometry.* Now, Kant says that number is dependent on time: it is thus just as much a phenomenal affair as the figure of geometry is; as the latter refers entirely to the world of sense, so also does the theory of number. It is impossible to count at all, Kant teaches, unless you suppose that the fundamental units are successive instants; this granted, you can also represent the units as successive points. In one or the other way, he holds, you *must* represent them if you are going really to count. He calls these instants and points *pure* perceptions, that is, definite particulars quite supersensibly apprehended—particulars that, strangely, have the property of being also universal. So that in order to have (and sufficing to have) a sensibly perceptible world, we must have (and need only have) a world set on instants and points; and in this wise the laws of number become real laws of Nature also. Extremely plausible is this; impressively so, in fact; and this view of number as subordinate to time and space has accordingly become more and more common since Kant's day. And now the decision whether or not mathematics is wholly a natural science depends on

* Algebra is purposely omitted here, for it is not any real *department* of mathematics, but only a system of recording and discussing mathematics; there is, properly speaking, no *mathesis* in it, no instruction upon the *objects* of mathematics, but only a scheme of notation and of operations through notation. It is very curious that of late mathematics has taken on a wholly algebraic form; for what is real and constitutive in mathematics is the two branches, number-theory and figure-theory. This change of form is the ground of the belief of many modern mathematicians that their science should be defined as a *generic logic*, far more comprehensive than the traditional logic of the syllogism, whether deductive or inductive, which they think occupies but a small corner of their field. They are thus led to say that their science has now become the *universal science of necessary conclusions;* or, the *pure investigation of relations considered by themselves.* I am constrained to dissent from this view, but any attempt to state my reasons here would lead us too far afield.

whether this Kantian doctrine of number is true. I should like to convince you that it is *not* true.

To do so, I will refer you to Plato, who teaches a doctrine much nearer the facts. He says that mathematics is an intermediary science, lying between the sciences based on induction, or mere likelihood (δόξα), and the one absolute science, based on complete mastery (ἐπιστήμη), which is the object of philosophy. What does Plato mean by this?—to what property of mathematics is he referring? In the Philosophical Union this last year we asked our accomplished associate, Dr. Montague—who is so well known to you of the Pearson Club—to write on this question, and while his answer to it was original, interesting, strikingly able, and deserving of attention on its own merits, he did not give, I think, the answer that is true, or that Plato would have given. That answer, after all, is very short and simple:—*Mathematics does, in its number-theory, deal with absolute reality.* Its theory of number is so nearly related to the nature of the absolute, number is so inwoven into the very tissue of absolute being, that it is no wonder grave Pythagoras mistook the numbers for the absolute realities themselves.

Here, you may halt me. I am teaching now, you perhaps will say, a metaphysical heresy,—the overwhelming drift of historic philosophy is to monism, not to pluralism: it sees that absolute being is at bottom one, and not many. Well, let me say, then, that I believe this historic drift has been a drift away from the truth into error, and that it has been owing to an interpretation of the absolute in lower terms than were available—terms lower than the highest thing we know in ourselves, in whose inner nature alone, as alone *directly* open to our knowledge, are the clues to what is highest in all being. I mean that in this drift to monism the sovereignty of our moral consciousness has been ignored; that the solution of the riddle of the absolute has been sought in principles less final than the moral ideal, and therefore insufficient. Now, the moral consciousness dis-

tinctly implies that the ultimate reality is manifold. It is not true, as misconstrued modern science has misled us into assuming, that the absolute reality is one and only; nor even that it is a sole unity including a merely derivative many, wholly determined by the One. Every being that can have moral responsibility must be absolutely real: on no less terms can it be the cause of its own acts, nor unless it is such cause can it be morally responsible. Thus conscience, the profoundest and clearest inner utterance of our reason, points straight to the *social* character of absolute reality, to an eternal circle of many individual beings, self-cognizant in a primordial mutual recognition. This directly means that number reaches to the very Profound of existence, and that mathematics, in so far as it is the science of number, goes so deep into absolute reality as to be intermediary between the essential doctrine of absolute reality, which is philosophy, and the doctrine of phenomenal reality, which is science in its restricted modern meaning.

Thus we come upon the authentic hierarchy in the total system of truth:—Philosophy, and then Science; and science, first as Exact, namely, Mathematics, with its organized derivatives in physics, chemistry, and astronomy; and next, science as Inexact, namely, all the departments of Natural History.*

V.

This result not only establishes a sense-transcending character for mathematics, refuting Kant's doctrine, but it contributes to support the claim of philosophy to primacy over science, and aids in further clearing up the distinction between the two, and the sources of the misunderstanding between their devotees. A man of science, as such, would hardly make a remark like that we came upon just now. And even a mathematician, simply as mathematician, would little think upon such a point as that. Con-

* This is as philosophy shows us the scheme should be. But with this fine clarity our modern prepossessions have, as I said above, played sad havoc.

siderations of this kind are supra-scientific,—they are, in a word, philosophical. The mathematician, for instance, *as such*, directly deals with only the *doctrine* of, say, number, with what the doctrine of number *is*,—what properties number has, what peculiar properties specific numbers have, —not with whence the doctrine cometh or whither it goeth, not with what range number has in the universal scheme of being. As a *man*, however, the man of science doubtless needs and also wants philosophy, *and will have it*. Nay, at the last he needs, he will have it, even as man of science; for the real postulates of every science are in fact metaphysical. Science cannot avoid such metaphysical postulates, even if it would; and, as we shall presently see, the man of science is always, in his basal refuges, "of metaphysics all compact"—his so-called scientific "elements" are all metaphysical conceptions, "mere ideas"; ideas, too, for the most part very crudely interpreted. Hence the danger is, that, when he sets to making his philosophy out, he will use inadequate categories, and consequently lodge on principles not final, because he is only skilled in the categories proper to his science, and is unfamiliar with the philosophical. What he stands in need of is a deeply thoughtful familiarity with the history of critical speculation.

This last assertion, coming from the philosophical side, can hardly fail to seem to you very much like arrogance; but I am confident it will cease to seem so when we once determine the real and exact difference between the philosophical and scientific points of view. For even when we extend science so as to include mathematics, it still is true that there is an immutable difference between the state of mind known as philosophic and the state called scientific.

I may give the otherwise rather colorless question of this difference some tinge of a more personal interest by placing it in the light of things that have been said in this room on other occasions. At times, when members of our philosophical circle have here dwelt upon the necessary primacy

of philosophy and the unavoidable subordination of science, or have discounted the philosophic dogmatizing of some scientific men, scientific colleagues present have been offended, and have said, "We do not think you do sufficient honor to science or to men of science." Now, I want expressly to deprecate such a feeling, and to say, as I have said in this place before, that whenever this personal difference comes up, this spirit of arrogance seems to characterize the philosophers less than it does the men of science: if there is an inclination to be arrogant, it lies rather with the man of scientific than with the man of philosophic interests.* For the over-zealous friends of science are wont to claim the whole field of respectable knowledge, and to stigmatize philosophy, at least by open implication, as worthless speculation; while the friends of philosophy are even eager to admit the indefeasible worth of science, albeit they cannot regard that worth as the highest. There ought, of course, to be no mutual hostility between philosophy and science, no arrogance in the cultivators of either toward those of the other, and none of these ugly recriminations. Each represents a real want of human nature as that nature operates in actual life, wherein it needs must operate. Each ought therefore to make room for the other. *Each* ought to accord to the other an ungrudging respect. Especially should this be the case on the part of the philosopher; and I am sure I have the right to say, as I have just indicated, that it actually is the case. Certainly nothing that your present speaker ever says on this matter ought to be taken in any other sense.——But enough of these personal aspects of the case: let us get on with our more serious task of candidly settling the fact that philosophy and science, though different, are both real, and of finding an exact demarcation of their provinces.

Meanwhile, if science has its own real field, and if philosophy also has a province really demanded by man

* Consult, for an example, Huxley on "paper philosophy" and "paper philosophers," etc., etc., *passim*, in his *Collected Essays*.

and open to it alone, what is the real cause of this irritability that certainly does from time to time manifest itself between workers in the two fields? I can at once say: It is simply that there is a necessary quarrel of philosophy, not with science, but with inchoate or inadequate forms of its own exercise. The philosopher never complains of the scientific man *as* a scientific man; but, when the man of science, responding to the call of his nature as a *man*, oversteps his field, raises the conceptions characteristic of his science into a universal or philosophic value and claims for this philosophy of his the peculiar prestige of science, as if to silence every other, then the maturer philosopher, at home in the fuller history and higher reaches of philosophic conviction, certainly does show opposition, and refuses to entertain the boasted certitude of this pretended "philosophy of science." He calls a halt, he calls the trespasser down, as he certainly has a right to do. He demands the credentials; and if it turns out that the new-comer has few or none to show, that his philosophical claims are such as have long since been passed upon by criticism and set aside, the discredit must fall, not upon science, but upon those of her votaries who, entering into the foreign boundaries, have mistaken the frontier outworks for the interior centre and citadel of the region.

And, let us note it, the fact is that this claim of there being a philosophy which preëmpts the whole ground of belief because it is the "philosophy of science"—science's own and only valid view—is a clear case of false pretenses. A peculiar "philosophy of science" is just as hollow a delusion as, for instance, any pretended "philosophy of the Church" would be. The Church once said *she* had a philosophy—of religion; this was *her* attempt to make the word of God, the eternal voice of Reason in the soul, of none effect by her tradition. But there is no privileged christian philosophy any more than there is a privileged christian science, nor is there protected scientific philosophy any more than there is an ecclesiastical. Philosophy properly

has no kinds; assuredly, no chartered kinds. Philosophy is philosophy, simply; just as science is simply science. Each has its own standards, its own canonics; each seeks purely what is true within its proper field; and to the universal canons of that truth all minds, so far as they *are* minds, will consent. To say there is a sole "scientific" philosophy is as futile as it would be to say there is a Greek or a German or an English or an American philosophy that alone is true. Truth is above all such contingencies of geography, or of history, or of special disciplines. There is of course no feminine logic or feminine economics or feminine geometry; nor is there any masculine geometry or economics or logic, either. And just as there is no sex in science, so there is no sect in philosophy. No, I repeat, philosophy is philosophy, just as science is science. It is one and universal; and to its one tribunal must come all alike,—male and female; Christian, Jew, Turk, and Hindu; Frank and German, Briton and American; plain general man of everyday and specialized man of science. It belongs to man as purely human.

And so deep is the human demand for philosophy, that a scientific man will sooner or later answer to it, and will endeavor to say more than all his science can warrant him in saying; but then he will almost unavoidably take for his ultimate and total truth some partial truth that his science gives him, and next will claim that what he advocates is final truth because *he* speaks as a man of *science*. Now, philosophy must not—nay, she cannot—contradict *science;* but philosophers do—and of right may—contradict a great many things that scientific *men* put forward. For instance, it is a prevailing fashion of scientific men in our day to say that the *entire* human spirit, *everything* characteristic of a human being, is the result of evolution. They proceed to talk about this as if to deny it were to contradict irreversible science. And yet, is there any scientific evidence for it?—any experientially verified proof that the *spirit*, the *soul*, the essential *person*, is the result of evolution? One

may safely challenge the "scientific" philosopher to produce the scientific warrant for the assertion. That mental *phenomena* are subject to evolution, that certain of them are the result of it, I willingly grant, nay, I firmly believe; but that the *spirit*, the unitary and active *principle* of our mind is so, there is not the slightest scientific evidence. Indeed, it is demonstrable that from the nature of the case there *can* be none.

VI.

Some of you will here say, possibly: "We don't quite understand this distinction between 'the mind' and 'mental phenomena.' What *is* 'mind,' really, but a collective term for a group of mental phenomena? What does anybody mean by saying 'mind,' if he doesn't mean simply that there are various groups of mental presentations?" Upon answering this sceptical question correctly, turns the whole matter, now, of the relation between philosophy and science. And thus we get a stage farther on toward the settlement of our main enquiry.

The philosopher Hume has voiced in a classical fashion the modern scientific sceptic's opinions, or feelings, about this question—feelings that many other people share. Hume says, in substance: "Whenever I turn in upon my own mind, I can never find anything real there but an impression or a succession of impressions, an idea or a succession of ideas. There is no trace of a permanent and changeless self. All that I can really mean by the word 'self' is just this group of presentations." Well, *is* there anything else? If there *is* nothing else, our talk about a changeless self, our attempt to hold this group of presentations, the John Smith of to-day, responsible for what the John Smith of yesterday then did, is a delusion. "John Smith," on this purely phenomenal view, is only a name, which for convenience sake we connect with the three different groups of sense-presentation that happened yesterday, that are happening to-day, and that will perchance happen to-morrow.

What right have we to blame the John Smith of to-day for the different John Smith of yesterday? Hume says, consistently enough, we have *no* right—it is a mere matter of convenience. Thus he casts a sceptical scorn upon all pretensions to real justice in the administration of government, and so dissolves the possibility of all patriotism: one can hardly muster up love for his country if his country means no more than this tacit agreement to promote the dominant convenience. Who knows but that in another generation the groups of presentation called criminals may be on top, and we, the virtuous groups, be underneath?—they the authoritative government, and we the objects of their punitive inconvenience and dissatisfaction? "When you are in Rome, you must do as the Romans do," sums up, on this phenomenalistic theory, the wisdom of behavior, both public and private.

Now, putting the phenomenalist view of mind in this way is simply a good method of exhibiting what the view really means. Seen in this light, it is likely to repel any serious person, or at any rate to give him pause in the career of "scientific" philosophy. But if anything better is to be done, you may well at this juncture ask, How?—how are we to make out the proposition that there is any such thing as a changeless mind? Let me say, by way of answer, that the inauguration of the better way was due to Kant, and that the real significance of Kant is that he showed us we must cease talking about this changeless self in a vague and general fashion, and must undertake to show, in *detail*, what the self really is. If the self is only a name, or even if, as Locke said, it is only a "capacity" to receive ideas, we have no right to talk seriously about it. What Kant in effect proposes as the problem of philosophy is, to find out exactly what we mean by a self that possesses "innate ideas"—the kind of self that Locke and his school denied. He undertakes at once to vindicate and to define the reality of this self by establishing *a priori* cognition, proving that there is a spontaneous and changeless know-

ing, which is the ground of law in all changes. If he can show that there is such cognition, yes, a system of such cognitions, he will be showing that there is a real soul, definable, one, and unalterable. Thenceforward, in psychology and in philosophy both, such a systematizing active unitary cognition *a priori* is what a soul is to mean. The memorable and momentous revolution which Kant inaugurated in philosophy was this: he brought men back from their natural prejudice that Nature is a "thing in itself," existing quite independently of the mind that knows it, to discover that it is a "thing in other," a thing in the knower, in fact; he led them to realize that the footing of Nature—of the great whole of changing phenomena, whether physical or psychical, actual or possible—is really in the changeless and spontaneous mind of the observer and experiencer.

But, notice now, when we are simply studying Nature, without being in the philosophic mood, we are not concerned about such a doctrine as that: it doesn't enter into *scientific* concern. Science simply accepts Nature, and cares nothing for the question, *What must Nature be, and how based, that science may be at once possible and significant?* Yet our *human* concern in such questions is so great, that, no matter how relentlessly we carry on our scientific processes, we always want to know what our scientific results *mean;* that is, *how they bear upon the grand-total of being to which we find ourselves belonging—how they look in its light.* When we begin to ask *this* question about our scientific discoveries, we have ascended beyond the scientific terrain, and have reached the philosophic level.

VII.

Thus, after all these lingering preliminaries, we have at length reached a position from which we can state, with some hope of carrying conviction, the true nature of the very important difference between philosophy and science. We can say it is exactly this: *That philosophy always considers the universal Whole, and nothing less, while*

science only considers some particular part or parts, or else some special aspect, of the entire round of being,—every science has its own specific province. For instance, even mathematics, entering though it does into every field of being, still has its restricted function: this is well enough said to be the consideration of things under the category of Quantity, and yet even this category, when viewed philosophically, is of wider import than mathematics takes account of. The category of Quantity is at bottom the distinction between the whole and the partial, between the universal and the particular; but mathematics proceeds by ignoring the whole and fixing its attention upon the parts, upon plurality or multiplicity. For all mathematics, in the last resort, is really a doctrine referring to number; even geometry rests back upon number. Undoubtedly geometry is sometimes defined as the science of form; and sometimes, also, as the science of space. But manifestly, though it describes many forms, and investigates certain of their properties, it doesn't even pretend to investigate *all* properties of figures, nor does it at all concern itself with form in general, with form *as such;* and while all its forms are certainly in space, it yet never considers space itself, nor attempts to determine its ultimate nature or its essential properties; all of these properties that it needs, it simply takes for granted.* Further, in its elementary and determining portions it is concerned with settling what the numerical relations are that are fixed by the shape of its forms: its whole business turns, in the end, into an endeavor to reduce the relations of figure to the category of number.

Why intelligent beings should make such an important matter of reducing figure to terms of number, can only be explained by saying that number lies so very deep in the

*I do not here overlook the professed discussion of space itself, and of its nature, put forward by the hypergeometers, from Lobatschewsky and Beltrami to Riemann, Helmholz, Klein, and Lie. With all their doctrine of space as "multiple," "flat," "convex," or "concave," etc., etc., they still never get to the question of what space really is, nor to that of its primary and necessary qualities.

essential constitution of intelligence. In short, there is no reason for this primacy that we give to number except that intelligence declares for it. Though surely that is reason enough: it is without pertinence to ask what the reason of reason is; one had as well ask what illuminates the light. I was amused the other day at a reviewer in the New York *Times*, who said that a certain idealistic doctrine of the soul "left mind to be explained." Idealism, however, discovers that mind alone is what explains everything else, and that hence it has itself no need to be explained. We here come upon a philosophic question, in the sense of philosophy as just now defined—the question, Is not mind the real Whole? is there anything that exists, or can exist, extrinsic to intelligence? Idealism answers: Yes, mind *is* the true Whole, and whatever else is real gets its reality as a presentation in mind—as a state or mode of conscious life.

I am not here to-night, however, to expound or to defend idealism; if you want to hear matter of that sort, you can have abundant chance by coming to the meetings of the Philosophical Union. Still, I suspect that one of the reasons why you have asked me to come here is the fact that the Pearson Club exists, the society formed by your younger men who have fallen in love with a philosophy of a pseudo-idealistic cast, more or less, though opposed to genuine idealism, and who urge a quasi-mechanical cosmology which they fancy is the legitimate outcome of science. "*We* want to know," they say, "not what ex-theologians may *conjecture* about these things, but what thinkers minutely familiar with the actual work in our laboratories can *tell;* these alone understand the facts that are the genuine signals of the Hidden Reality." Still, they are willing to listen occasionally, by way of contrast, to an idealist such as I am. And I have no doubt the Pearson Club will do them all good, if they are only wise and candid enough to invite into it a sufficient number of thoroughly trained students of philosophy, and will open their minds to what these say. To be quite frank, I believe that what people of

science nowadays most need is free communication with people of the other camp, especially with the idealists who thoroughly understand their doctrine. On the other hand, we of the philosophical side should (and we cordially do) admit our need of keeping informed of science, and of knowing accurately its methods and its general results. All men, indeed, deeply need to keep in commerce with each other's serious use of intelligence. I am sure, for my own poor part, that I should never have known anything about philosophy if it had not been for other men—if I had not enjoyed the converse of those who led me to read my Plato, my Aristotle, my Kant, and my Hegel. I am sure, too, that I am deeply indebted to the study of science which I was able to accomplish in my earlier career, and to such scientific reading as I have been able later to keep up.

VIII.

But the advantage works both ways. So, for the remainder of my hour, I am going to enforce, as well as I can, the need students of science have of a thorough familiarity with philosophy. I want to corroborate what I said a while ago about the rather primitive character of "scientific" philosophizing, in its first attempts and also in some of its later. I wish briefly to show how true it is that the philosophy with which many scientific people spontaneously take up is of a quite provisional sort, sure to give way when once they bring thorough criticism to bear upon it.

To carry out this purpose, let me set before you some of the successive stages in philosophy, especially those favored by men of science when they play philosopher. The first stage of philosophy is common to the usual man of science and the ordinary man of everyday. We all—scientific people and plain everyday people alike—begin with the obvious distinction between our minds and the contrasted things, and we take this at its value to our first impression: in short, we over-estimate it, and suppose that things, merely sensible things, are real in the same sense that our minds

are, or even that they are real in some greater sense. Now, philosophy will never in the world *deny* this distinction: rather, philosophy calmly proceeds to clarify it; for even the earliest prejudice of intelligence has some truth. But the clarification will soon do away with the first bald and realistic form of our belief in the distinction. Science, on its part, simply assumes this distinction, and does not bother with subtleties about what it really means. Moreover, the training in science is very liable to get us into the bad habit of assuming facts—"ascertained facts"—to be final, and in effect dead. So when the man of science takes to philosophizing, he unwittingly begins by taking this fundamental distinction in the baldest and hardest way, and starts out as a realist of the most naïve description. He believes firmly in the independent existence of space and time, and of the "matter" that both "contain." [I could name you great names here if I chose, but I refrain.]

For example, a common doctrine connected with geology is that of the independent perdurance of "geologic time," filled with all manner of geologic forms. Geologists have even pictured the world as it *looked* before there were any eyes to see it: you are familiar with the scene-painter canvasses upon which it is displayed on the walls of lecture-rooms. This is put forward as if it were part of science. But it is no part of strict science; on the contrary, it is the most genuine speculation; the utterance, too, of a primitive and even barbarian philosophy, namely, that there is a fixed something called the material world, isolated from all intelligences, yet with all the sensible properties that conscious beings impart to it. Again, this comparatively thoughtless and uncomprehended realism is seen in the speculative additions made to strictly scientific physics, in the attempt to explain the dark places of that science. There is, says this style of speculative physicist, an ultimate, supersensible, hyperphysical sort of matter, and this is absolutely real. This he calls the ether: he represents

it to be an ideally perfect fluid, that is, a gas infinitely elastic, therefore absolutely pervading all space. The ether, he next says, is thronged with atoms, and these atoms in their various combinations, mechanical or chemical, make up the greater bodies, organized as well as inorganic, which we have to deal with by our senses: the motions that these molar masses undergo are owing to the molecular motions of the atoms, and these again, in the last resort, to the motions of vibration in the ether. This quasi-mechanical theory is immensely plausible until its essential self-contradiction is appreciated, and this the philosophical critics have not been slow to point out.*

It is with right logic that the speculative scientists have since bestirred themselves to avoid the difficulties of the etheric and atomic hypotheses. Recently we have seen them come to safer statements: it is rather entertaining for idealists to notice that three different scientific people of eminence, Pearson, Mach, and Ostwald, have now without collusion said that it is not the business of science to find any real *law*, much less any real substance or real cause; science, they maintain, deals simply with the changes of phenomena, and with their succession; it merely *describes*,—to be sure, not only each separate part of the phenomenal world, but the regular or customary groupings of the parts; this latter description is all that science means by "explanation." But idealists would have told them long ago that if science is confined to meaning such knowledge as is attainable by observation, experiment, and induction empirically construed, this would be the exact account of what the rigorous scientific truth is. Still, when science restates its case in terms like these, it is indeed precise, but is not in the highest sense scientific: it falls short of the scientific aim and ideal, which is always to attain to explanation by the discovery of *law*. When science says that it will no longer search for *necessary*

* See, for instance, Stallo's *Concepts and Theories of Modern Physics*. New York, Appleton and Co., 1882.

connections, will ignore ultimate realities and causes, and will suppose nothing at all except phenomena, it becomes false to its proper business, its highest, its genuine aim, which is that it shall be the support and auxiliary of human action for human ends. For all human action is based unavoidably upon the assumption that we are in possession of natural *law*—that the connections of the past will really hold for the future. Once let us be thoroughly convinced of the contrary, our capacity to act would be paralyzed. For us, then, nothing can be *knowledge*, nothing deserve the high name of *science*, that by abandoning the discovery of law as impossible exposes us to such a living death.

Now let us look closer at the philosophic credentials of that very elementary stage of philosophy—the stage of natural realism or natural dualism, as it is called, for which there are two orders of existence, both equally substantive and unconditional, the mental and the material. If we were to ask with Berkeley what evidence there is, or can be, for such a supposed material reality wholly independent of our intelligence, we should soon find that we cannot get any ground for it. We should presently have to confess that at best it is simply an hypothesis, adopted to explain our sensible experiences. Berkeley would then dispose of it for us as follows. Any valid hypothesis, he would say, must answer to these four conditions: (1) It must be intelligible; (2) it must be coherent; (3) it must be indispensable; (4) it must be sufficient. He would then show that the hypothesis of the material "thing in itself" answers to neither of the four. (1) It is not intelligible: nobody can tell what he means by it. Mr. Spencer tells us we should recognize that the omnipresent energy at the basis of all things is neither mind nor matter, but is the Unknowable; and we can truly say that the same property of unknowableness—utter unintelligibility—attaches to "*per se* matter"; we cannot rightly say that "grass *per se*" is green, nor that any other property by us cognizable really belongs to it. (2) It

is not a coherent hypothesis: it is really self-contradictory; or, rather, it involves *us* in self-contradiction. We put it as a basis and ground of explanation, and yet we are compelled to confess that it is unknowable, while the unknowable, of course, can explain nothing. (3) It is not indispensable: we can far better explain the reality of the sense-world by other hypotheses. (4) It is not sufficient, will not do the work required: it cannot make clear to us why we perceive as we perceive. Nay, it affords no aid at all toward the desired explanation; its empty meaninglessness is as helpless as utter nought would be.*

Philosophy, however, even in the hands of scientists, soon gets over this simple and unsuspecting natural realism. From its dualism, which renders the reciprocal relation of mind and body inconceivable, the valorous thinker, braving the terrors of forsaking religious tradition, passes usually to materialistic monism, as the plausible solution of the puzzle. But, ordinarily, he does not delay with this long. The warnings of Berkeley still hold against this hypothetical lone "matter," and in the view of sober second thought its utter break on arriving at the requirement to explain consciousness disposes of it finally.

It is naturally supplanted by the theory of "phenomenal parallelism"—the modern psychological and biological doctrine that mental and physical processes are simply concomitant; a view that Descartes named the theory of "conscious automatism," and that Huxley has celebrated and popularized in our day. I mention this with particular emphasis, because it is so characteristic of the "philosophy of science." Mr. Spencer adopts it, and then by a stroke

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*These objections, one may remark in passing, apply also to a great many of the conceptions that we have been in the habit of calling by the name of God; for God so conceived of is quite as futile for philosophical purposes, and therefore for an abiding religion, as this hypothetical "matter" and its cognate materialism can be. And this shows that there may be a professed spiritualism that is quite as crude philosophically as the crudest materialism. Let the aspersed scientific philosophizers console themselves, if they can, with these reflections on the loose philosophizing of theologians.

of speculative insight—real insight, so far as it goes—refers the persistent concomitancy of physical and psychical phenomena to the "omnipresent energy" of his Unknowable, which, he says, "wells up" in Nature as moving matter, in us as consciousness. Noteworthy, however, is the fact, that this pet philosophy of the "scientific" lays an almost causal accentuation on the physical stream of phenomena, and tends to explain the psychical stream by means of it: that trace of its earlier materialism remains over in the later stage of its thought. The scientific man believes in the reality of the physical to a degree to which he can hardly raise his belief in the psychical. The true way of explaining perception, he says, is to recognize that there is an inworking process from the external world to the mind —that "consciousness is merely the subjective side of a nervous shock." The more exact and careful thinkers of this school, however, say we must suppose that the mental states and the physical states are strictly in parallelism, instead of either causing the other. Positivism is the preferred name for this purified phenomenalism, from which all traces of materialism are intended to be sublimed away.

But when this point is reached, an explanation is needed of the rise and continuance of the two streams, and, above all, of their persistent concomitance item by item. So our philosophizers come by the "necessary hypothesis" of the Unknowable, as the basis of all. Thus their philosophy passes over from sheer phenomenalism to the agnostic stage: Spencerianism is the philosophy *par excellence* of scientific men. And many of you here present would most likely say to me: "If *you* had studied science more, and theology less, you would feel as we do,—that this bottoming of the world of experience on the Unknowable is the best account of the intricate case. To *us* it is an irresistible conviction, that the world of actual life has this parallelism of its two phenomenal streams; and we feel it wisest to say, with Spencer, that the One Reality, whose nature is to us unknown and forevermore impenetrable, wells up as consciousness on

the one side, and on the other side as physical things. Why don't you see that the scientific facts, presented with clearness, inevitably lead that way, so wide apart from your way of idealism, of personalism, of antiquated theism?"

Well, to that I must reply by asking you to plant a more searching gaze upon the warrant by which agnosticism accredits the real existence of its Unknowable. That is certainly no warrant founded on experience, for it looks to a supposed Object that does not and cannot fall within the experiential ken. If it has any value at all,—and I agree with you and with your master Mr. Spencer, as against Auguste Comte, that as intelligent beings we cannot resist its evidence, and that the reality of its Object is indeed "an absolute datum of consciousness,"—then pure reason is at any rate capable of one judgment *a priori* that is objective. The thinker who will now bestir himself, as consistently he should, to explain how this one triumph of pure reason over the limitations of sense is possible, will find that it implies others, and he will fall into the sure path toward filling out the void of the so-called Unknowable with all the fulness of the world of minds, the real grounds and causes of all things. But in one point I should agree with those of you who adhere to Mr. Spencer, rather than with those who adhere to Mr. Fiske:—we ought not to call the Unknowable Ground of all things God; for in thus getting to a cosmic theism instead of a personal one, a naturalistic instead of a moral, we simply confuse religious meanings and darken counsel by words without knowledge. Not until we have legitimately transformed the Unknowable into the Personal, have we the right to use the name of God.

IX.

We follow thus the advancing path of the philosophizing thinker, be he man of science or be he other, as his thought matures and becomes more critically comprehensive:—Natural Dualism, Materialism, Positivism, Agnosticism, Idealism. Once arrived upon the level of this last,

new and profounder questions will open upon him, into which our time now forbids us to enter. But we may forecast him as next wrestling with the issue between monism and pluralism in its supreme form; for he must decide whether the universal Whole is a single all-inclusive Mind, in which all other minds are integral and necessitated parts, predestined utterly, or is an eternal Society, of many minds, each individually free, and in freedom constituting their assemblage into an immutable moral order, the everlasting City of God. And now I trust I have said enough to convince you not only of the interest and importance of philosophy, but also of its indispensableness to science itself as well as to the man of science. Science presupposes philosophy, and draws from that ideal world its own foundations and deepest inspirations, thus openly betraying its dependence and, in right, its subordination.

Philosophy having, then, its own proper aim, and science having its own aim also, there is no real conflict between the two; and there would be no imaginary one, if the adherents of each would keep to their own province. In this connection particularly, may I now, as long familiar with philosophy, and not wholly ignorant of science, take the privilege of saying—I hope without offense—that when men of science unwittingly step across their boundary line into the philosophic field, and, being in foreign territory, set up there proclamatory claims, they need not feel astounded or outraged if the settled inhabitants meet the claims with dissent and doubt at least, if not with resistance? For experienced philosophy recognizes these quasi-scientific theses, that lay claim to new philosophic truth, as old and comparatively uncritical philosophemes, long ago examined and relegated to the limbo of archæology and curios. When a scientific man not deeply versed in philosophy sets out to philosophize, he does it quite as other beginners do: he adopts a view crudely plausible, without suspecting the critical pits beneath it. Philosophy, however, learning by repeated thought the lesson of persistent doubt, goes on to

criticize all its successive conceptions. It gradually finds that full intelligibility is wanting to these first philosophizings. And the man of science ought to be the last to wonder at such a fact, for it is simply the analogue of what has happened, and still is happening, in his own field. Early science is really ignorance, as compared with science of the present day: let the physiologist remember "animal spirits," "humors," and "vapors"; or let the physicist and the chemist call to mind the delusions about "phlogiston" and the "imponderable agents."

But now let us return to the difference between science and philosophy, as we awhile ago settled it to be. Science is the study of particular aspects or portions of the eternal Whole—that portion, especially, which is known as the phenomenal, the temporal, the changeable; not the changeless, the eternal, as such. Philosophy, on the other hand, always views the Whole, or at least has it in its scope. And upon this I can readily imagine you saying: "But is such a thing possible?—nay, it surely is impossible, is it not? How foolish of vain mortals, with their poor brief vision, to undertake a view of the Whole!" Now I must say to this, first, that it is itself an assertion claiming philosophic or universal validity, and that agnosticism itself is a doctrine concerning the Whole; and, next, in behalf of the higher philosophic aim, in behalf of the utmost ideal of thinking, that I do not know that Philosophy has ever claimed that she actually had reached the complete view of the Whole; certainly she would not claim that any vision of hers reached to all the vast detail of the Whole, or embraced the Whole in that sense. Philosophy as certainly, however, *loves* all-embracing wisdom—her very name proclaims that: though she may not actually possess it, it surely is her aim; and that aim, as she intends it, is moreover practicable. For she does not affect omniscience in the sense of omnipercipience: hers is not an instantaneous and perceptive, but a discursive and gradual comprehension. Yet she does affect a sort of

omniscience, and has no shame in confessing to affect it —the power, namely, of seeing entirely round the Whole *as* whole, of seizing the ensphering *system*, within which all the details of the Whole must fall.

I will add a single point, and close. We ought not to be so discouraged about the possibilities of affirmative philosophy. Amid all the conflicts, the doubts, the failures, of the long and troubled history of thought, we do discern that there is advance; slow, indeed, but steadfast when seen in the large. Moreover, in every period and place where philosophy has had an opportunity to run a long career, that career has covered the same progressive stadia, and has come out upon the same idealistic conclusion. Nor can the presence of dispute and conflict in that history be laid by science to the comparative discredit of philosophy; for science, even at present, is the scene of disputes as violent as any that have ever rent philosophy. Beyond all these disorders, and in large part because of them, science and philosophy alike advance to victories ever greater and more secure.

THE BEGINNING OF A NEW YEAR.*

By Benjamin Ide Wheeler.

The University of California is beginning its thirty-fourth year of work, the thirtieth year at Berkeley. May it become of all its years the best! With your coöperation, it surely will be.

Since we last met the University has suffered loss in the death of two members of its governing board. Arthur Rodgers, a graduate of the class of 1872, was appointed to the Regency in March, 1883. He was a wise man, prudent to discern the needs of the time and the drift of public thought, skilful to devise for men a common basis of friendly action, well-informed concerning academic standards and usages, sympathetic always to the best ideals of university life, devotedly attached to this university and all its interests. To its service he gave himself unstintingly and unselfishly. General W. H. L. Barnes, long a brilliant figure at the bar and in the public affairs of this state, was appointed Regent in 1899. He was a master by voice or pen of all the inspiring and persuading forces of the English tongue. The strong impulses of his heart were quick to befriend the weak and the oppressed. A fine courage and rugged frankness of soul made him often bold to speak where guile had held its peace. To this university, and particularly to the interests of the Lick Observatory, he gave gladly and proudly his best service.

*Address delivered by President Wheeler at the opening University Meeting of the academic year, August 18, 1902.

On the 26th day of July passed to his rest from within the shelter of this state one of the most devoted friends of education this country has ever known, Charles Kendall Adams, successively professor at the University of Michigan, president of Cornell University, and president of the University of Wisconsin. He had established the home of his declining years at Redlands, in this state, and had become a Californian; he had with great delight accepted a proposal to deliver before this University in the coming autumn a course of historical lectures, and had already in his strong heart's interest enrolled himself as one of our academic household. Therefore I may speak of him here; and, because he was to me a fatherly friend, and to many another like me, I *must* speak of him. He merits for one thing above all others our respect; he labored for the institution and the cause he represented, not for himself. He had no private ambition to rise in rivalry with the interests of his university. He was ready to be forgotten, or to sit down under reproach, if only the great cause throve. It was given him to lead two institutions, Cornell and Wisconsin, out from the condition of commonplace, local colleges into the ranks of the ten leading national universities. Each of these under his administration acquired significant library collections and library buildings which rank among the three best university libraries in the country. For each he assembled a teaching-force of first-rate quality. He never considered so base a fear as that his faculty might contain men stronger than himself. He did not excel in personal attractiveness, and was not called magnetic. He bore no marks of brilliant genius. He was a plain American, reared on a Vermont farm, and the strong lines of his rugged face told of struggle, and somewhat of suffering;—for once and again in his life the knife of detraction and bitterness had cut to his heart's centre;—but wise and well-poised he carried no bitterness in his soul. He suffered in silence, and out of his suffering rose glorified in sterling manhood like gold tried in the fire. Now he goes down to his grave covered

with honors, blessed in the memory of a generation of students, and two great American universities rise to be his unperishing monuments. Farewell! Faithful man, Great-heart, wise friend of education, farewell!

And now I turn from the dead and confront the living. Here I behold them massed about me a great body of life, marshalled by rank in all the ages, from that which tints the vague hope of the neophyte pink to that which scatters the hoar frosts on the heads where wisdom has come to reside. It is no mere assemblage ranged by seats of platform, gallery, or floor; in the transfiguring light of this opening day our eyes must see it as a long procession of the generations marching with unflagging steps on and ever on by the sure, old, long-trodden turnpike that leads out from the seed-lands of birth over into the fruitages of eternity, one solemn, compact, noble cortège in which every person, man and woman, young and old, bears the insignia of that famous old bond and league we call "University," a league and a bond which unites the various ages and estates of man in one common devotion and emprise and joins in one divine society the great memories of the dead and the high opportunities of the living.

You who have enrolled yourselves in this bond have assumed thereby certain weighty obligations. There are many things you cannot do; there are certain things you must *be*. It is well I should repeat some of them to-day, repeat them plainly, that they may enter in at the ears of the neophyte, that they may quicken the minds of those who have heard before.

The University is a place for the training of life through the intensive practice of methods and acts which represent life's best. Its aim is to make the individual life freer, healthier, and more effective for good, and to lift the total life of man in society toward better things. You have a duty therefore toward yourself, and a public duty toward society and the state, and to whom much has been given, of him much will be required. Your duty is not under suspen-

sion, awaiting the event of your graduation. All this about you here and now is life, and what is good and honorable and seemly in life at large is the standard of what is expected of you here. It is the commonest mistake of young folks to think of life as an indefinite stretch of opportunity. The time to stop dawdling is now. The time to lay hold on work seriously and strongly is now.

Here is no longer place for dolls and toys. You are men and women in the midst of life's work, and having become men and women, it behooves you to put away childish things. The old-fashioned small college as a school for boys and girls has yielded in the development of American education to the great university as a working place for men and women of an average age of twenty-one. The modern university student is no longer viewed as a child. The monastic tradition has lost its hold, and students are no longer treated as "inmates",—nor again as special creations. They are plain "folks". If a ten-year-old boy feels it necessary to wear the largest size catcher's glove to catch a tennis ball, we forgive him his toy, but when a full-sized man thinks he must wear a sweater to demonstrate his robustness, we are weary of soul.

A university is a place where men and women are trained to face realities, to discover the sources of truth, and to accustom themselves to the discerning of it. Its warfare is against ignorance, prejudice, and personal bias. A university student who uses the power here acquired to establish a cause he knows to be wrong, to set forth facts in distorted form, or to persuade man that the lie is the truth, has stolen arms from the arsenal to aid the enemy. He is a traitor.

It is all too easy to cheat one's self into believing that one's favorite opinion is the truth and that one's craving is the right, but it is a peril to one's soul to yield to the self-deceit. Train yourselves to advocate what you know to be right, and stand in fear of no man. Train yourselves to speak what you know to be true, and shame the devil.

When a university man is asked a question orally or in writing whose answer he does not know, the answer he is bound to give is: "I do not know", and he is bound to give it though the heavens fall. Generally they do not fall—they brighten.

You will find it very easy to cheat yourself, when in a class election you are asked to give your vote for some one in return for a vote for yourself or some candidate of yours. You will argue with yourself that there is not much difference between the candidates anyway, that a man must look out for his own interests first, that this is the way they do in all politics, etc., until you have blinded your own vision of the truth and pushed yourself one step further on the way to moral death. To sell your vote for another vote is to sell it. Make no quibbles about it. Vote selling is unworthy of a university man; it involves an action on an unreal basis. You pretend to be voting for the worthiest; you are really voting according to another motive. It is poor preparation for service to the state such as you men ought to render, that you should imitate in your elections the methods by which in public politics men pervert their supreme duty to the state.

The university is a place for work. There is not much danger of your overworking. Most cases of supposed overwork are cases of over-worrying, bad planning, or dawdling. There is in general more danger of rusting out than of wearing out. Work regularly. Plan your work. Carry out your plans. Work all day. Use the vacant hours fully. It will rest you more than sitting on the steps. Meet your appointments as they come along, all of them,—and punctually. Business men do not want employees who "cut" whenever they take a notion and who are late because they stop to speak to a man.

Get your work done or plan for it so that you will have time to mingle with people. A considerable part of education comes from contact with your fellow students. Do not be a recluse. Do not get into the habit of shunning people.

Do not allow a spirit of offishness or snobbishness to grow upon you. Learn to like people "just as they come." There is something worth while in every man. Only take people at their best, and you will be surprised to find how universally interesting people are. If you find yourself settling down into satisfaction with a limited circle of acquaintances, particularly if that satisfaction involves depreciation of others whom you know little or not at all, be sure you are on the wrong track.

This is one of the dangers involved in fraternity membership. Have you noted how hard it is to bring about the election of a man into a fraternity in the later years of his course? It is unquestionably due to this false crystallization of companionship. One and another in the body has come to feel that this man whom they have seen much but have not known well could not be companionable. So does habit make fools of us. Do you ask me if you should join a fraternity? There are decided advantages in so doing. You will have therein an assured basis of companionship. You will have a home with a body of men predisposed to be friendly and sympathetic. You can be assured you will not be a recluse. After graduating you will find the fraternity to be a tie to bind you to the college. When you return you will have a place to go to, and a starting-point from which to pick up the old threads. But I should warn you to enter cautiously upon your choice. Do not join a body which has not a nucleus at least of sober, earnest, studious men; and this for two reasons: first, such a fraternity will not ultimately prosper; second, it will be likely to interfere with your own success as a student. Of all things do not allow such a connection to shut you off from the great body of your fellow students or nourish in you any semblance of the spirit of exclusiveness.

Do not make yourself "prominent" at the beginning of your course. Such prominence seldom wears well. Be patient and let prominence take care of itself. There are four years ahead. Loudness of speech, loudness of dress,

loudness of manners are unworthy of those whose training bids them spurn the unreal and meretricious, and cleave to the genuine.

Take care of your health. Select for yourself some form of free outdoor exercise. Do not leave athletics to a few specialists. Too few men are reached and benefited by college athletics. Get a place, if possible, on some one of the university teams, but *one* is enough.

Attend the University Meetings. They will help to make you feel yourself a member in the great body. They will give inspiration for better living and working.

Make the personal acquaintance of your instructors. Go to them; do not wait for them to come to you. You will gratify them thereby; you will be benefited yourselves. You will be glad to find how much warmer-hearted some of us are than we look in the lecture-room, or on the platform. There is nothing like knowing men hand to hand.

The year is now begun. Your opportunity is before you. It is yours for this once; it will not come to you again. Step in and improve it. Now is your chance. What you are this year will contain the sure promise of what you are in the life to be.

A COMPARISON OF THE ENTERING CLASSES OF 1901 AND 1902.

By WILLIAM DALLAM ARMES.*

Several years ago a member of the Faculty, recently from the East, showed me a table that he had made giving the rate of increase in the entering classes of a dozen or so of the leading universities of the country, and said, "If our present rate of increase keeps up, in a few years the number of intrants at the University of California will be greater than the number at Cornell, Columbia, Yale, or Harvard! Of course," he added, "the saving clause in that sentence is, 'If our present rate of increase keeps up.' But that is impossible. This year is phenomenal, and we have reached the limit!"

The next year, as I took a somewhat malicious satisfaction in pointing out to him, the number of intrants was even greater than the year before; but it appeared that that year, too, was "phenomenal." The third year, however, he concluded that our "phenomenal" years were as regular as our "exceptional" weather, and acknowledged that he could see no limit to the growth of the University.

But this year there was good reason for prophesying a decrease. Of the 769 intrants admitted during the first term of the academic year 1901–2, 540 were Regular, 90 Limited, and 139 Special. Now, not only was admission to Special status to be more closely guarded this year,

*Chairman of the Committee on Admissions.

but the Academic Council at the meeting of February 7 virtually abolished the Limited status for Freshmen by making the requirements for admission to that status the same as for admission to Regular. A large decrease in these two classes of students was therefore inevitable (as a matter of fact it amounted to 102), and as the average rate of increase of the number of Regular intrants during the last five years had been $10\frac{1}{10}\%$, the normal gain in this class of students would be but 54. A decrease in the number of intrants seemed certain.

But once again the record has been broken, and up to October 15, 1902, 817 intrants have been admitted to the University. In spite of the fact that entrance to that status, too, has been made more difficult, instead of increasing normally the number of Regular intrants has increased nearly 28%!

Two questions about this great number of students are of interest to every one concerned in the growth of the University—Whence? and Whither? From what States and from what schools in California do they come? Into what colleges do they go?

To answer these questions I have tabulated the statistics for this year, and to make the tables more valuable, as showing tendencies as well as facts, I have inserted, in italics, the corresponding figures for last year. The accompanying tables, it may be well to state, are not based on the "Summary of Undergraduate Admissions" appended to the list of intrants published September 1, which indicates merely the number admitted up to that time; but on the records of the Committee on Admissions, to the end of the first term last year, and to October 15 this year.

From the State of California 474 Regulars, 76 Limited, and 101 Special intrants entered in 1901, a total of 651. This year there were 585 Regular intrants from the State, 20 Limited, and 85 Special, a total of 693.

The number coming from accredited schools in California is as follows:

Alameda High, *14*, 12; Alhambra High, *1*, 1; Anaheim High, *3*, 3; Arcata Union High, *1*, 3; Auburn: Placer Co. High, *1*, 0; Azusa: Citrus Union High, *2*, 1; Bakersfield: Kern Co. High, *6*, 1; Belmont, *3*, 11; Benicia High, *1*, 0; Berkeley: Boone's, *14*, 12; Berkeley High, *55*, 41; Berkeley: Miss Head's, *0*, 4; Berkeley: Peralta Hall, *9*, 3; Bostonia: El Cajon Valley Union High, *1*, 1; Campbell Union High, *0*, 1; Centerville Union High, *2*, 6; College City: Pierce Joint-Union High, *2*, 0; Colusa District High, *1*, 2; Compton Union High, *2*, 0; Corona High, *0*, 1; Coronado High, *0*, 1; Covina High, *1*, 2; Dixon Union High, *0*, 2; Easton: Washington Union High, *0*, 2; Escondido High, *4*, 2; Esparto Union High, *1*, 1; Eureka High, *3*, 2; Fresno High, *7*, 9; Fullerton Union High, *2*, 4; Gilroy High, *1*, 1; Hanford Union High, *6*, 6; Haywards Union High, *2*, 4; Healdsburg High, *1*, 3; Hollister High, *5*, 6; Irvington: Anderson's, *7*, 3; Livermore Union High, *2*, 3; Lompoc Union High, *2*, 1; Long Beach High, *5*, 4; Los Angeles High, *18*, 30: Marysville High, *2*, 10; Mendocino High, *2*, 2; Menlo Park: Hoitt's, *1*, 1; Merced: Merced Co. High, *0*, 4; Mills College, Seminary Dept., *2*, 0; Modesto High, *4*, 1; Monrovia High, *2*, 0; Napa High, *1*, 12; Nevada City High, *1*, 6; Oakdale Union High, *3*, 3; Oakland High, *45*, 45; Oakland: Miss Horton's, *0*, 1; Ontario: Chaffey College, *2*, 0; Oroville Union High, *2*, 4; Pacific Grove High, *5*, 1; Pasadena High, *11*, 8; Pasadena: Throop Polytechnic, *1*, 0; Paso Robles High, *2*, 2; Petaluma High, *7*, 1; Pomona High, *7*, 7; Porterville High, *2*, 2; Red Bluff Union High, *0*, 4; Redlands L. and C. Union High, *5*, 4; Redwood City: Sequoia Union High, *0*, 1; Riverside High, *9*, 10; Sacramento High, *4*, 20; St. Helena Union High, *2*, 6; Salinas High, *2*, 5; San Bernardino High, *1*, 1; San Diego High, *10*, 9; San Fernando Union High, *1*, 2; San Francisco: California School of Mechanical Arts, *9*, 10: San Francisco: Girls' High, *19*, 29; San Francisco: Hamlin, *2*, 5; San Francisco: Irving, *0*, 2; San Francisco: Lowell High, *32*, 24; San Francisco: Mission High, *11*, 9; San Francisco: Nôtre Dame, *2*, 1; San Fran-

cisco: Polytechnic High, *6*, 10; San Francisco: Trinity, *2*, 3; San José: Academy of University of Pacific, *1*, 1; San José High, *5*, 6; San José: Washburn, *1*, 0; San Luis Obispo High, *2*, 8; San Mateo: St. Matthew's, *2*, 5; San Rafael High, *3*, 6; San Rafael: Mt. Tamalpais Military, *2*, 1; Santa Ana High, *7*, 4; Santa Barbara Collegiate, *2*, 0; Santa Barbara High, *5*, 6; Santa Clara High, *3*, 1; Santa Cruz High, *8*, 5; Santa Maria Union High, *2*, 4; Santa Monica High, *0*, 3; Santa Paula Union High, *2*, 0; Santa Rosa High, *9*, 12; Selma Union High, *2*, 3; Stockton High, *8*, 6; Suisun: Armijo Union High, *1*, 2; Truckee: Meadow Lake Union High, *2*, 3; Ukiah High, *2*, 4; Vacaville High, *1*, 7; Vallejo High, *3*, 1; Ventura Union High, *7*, 10; Visalia High, *2*, 0; Watsonville High, *5*, 8; Willows Union High, *1*, 0; Winters Union High, *0*, 1; Woodland High, *8*, 3; Yreka: Siskiyou Co. High, *0*, 2.

Of the 116 accredited schools on the list last year, all but 19 sent graduates to the University. Of the 115 on this year's list, all but 21 send graduates. Five schools that appear on both lists have sent no graduates either year. Of those that are named in the foregoing table 54 (one of them on the list this year for the first time) send more students than last year, 15 send the same number as last year, and 40 (4 of them not on the list this year) send fewer. In most cases the decrease is small, from one or two to none,and, as the schools are scattered all over the State, is apparently due merely to the ordinary fluctuation in the size of graduating classes.

Fifteen schools send ten or more recommended graduates this year. They are in the order of their representation: Oakland High, Berkeley High, S. F. Girls' High, Los Angeles High, S. F. Lowell High, Sacramento High, Alameda High, Boone's University, Napa High, Santa Rosa High, Marysville High, Riverside High, S. F. California School of Mechanical Arts, S. F. Polytechnic High, and Ventura High. These fifteen schools send all together 285 intrants (Regular and Limited), or a little less than 35% of the class.

In conclusion, in view of what has been said in the third paragraph, a word is advisable as to the number of students in Limited status this year. It was found that a strict interpretation of the vote of the Council on February 7 would work hardship on a number of students, many of them from other States, who were undoubtedly prepared to do university work but did not have exactly the matriculation requirements of the colleges that they desired to enter. On recommendation of the Committee on Admissions the Council, therefore, at the meeting of August 22, admitted 21 intrants to the Limited status. Later the Committee admitted 9 others whose cases were similar. Before the list of intrants had been published, however, two of those admitted to Limited status had become Special students, and two, having secured additional credits, had become Regular. The total number of intrants in Limited status this year, therefore, is 26, as against 90 in 1901.

But there is a greater difference between the Limited students that enter this year and those that entered last than the mere difference in numbers. Last year 20 students entered the University by passing the entrance examinations. Sixteen of these were not graduates of preparatory schools, and of these 12 became Limited students. This year the number entering by examination was 13, of whom 11 were not graduates; but all succeeded in obtaining sufficient credits to admit them to Regular status, though in no case without conditions. Six of the 11 had secured preliminary certificates at the January examinations, to which they were not admitted without certificates from their teachers that they were prepared in the subjects on which they applied for examination. No intrant has been admitted to Limited status this year who was not a graduate of a preparatory school, nor has any one been admitted to that status who did not have credit for at least the minimum required for entrance to Regular status in *some* college of the University. A Limited student this year is not, then, one who has but a portion of the credits required of a

Regular student, but one with what may be termed a misfit preparation for the college he wishes to enter; as in the case of a student recommended in the first ten matriculation subjects, which would admit him to the College of Letters without a condition, but who could not be admitted as a Regular student in the College of Mining because lacking credit in higher Mathematics, Chemistry, and Drawing. The entering class of 1902 is not only the largest but also the best prepared that has ever entered the University.

TABLE 1. NON-RESIDENTS.

FROM FOREIGN COUNTRIES.	Reg.		Lim.		Special		Total	
	'01	'02	'01	'02	'01	'02	'01	'02
Algiers					*1*		*1*	
Argentine Republic						1		1
Bohemia					*1*		*1*	
British Columbia		1						1
Chile	*1*				*1*		*2*	
China	*3*	1					*3*	1
England					*1*	1	*1*	1
Japan	*1*					2	*1*	2
Mexico	*1*		*1*				*2*	
New Zealand		2						2
Peru		1						1
Roumania					*1*		*1*	
Turkey					*1*		*1*	
Wales					*1*		*1*	
	6	5	*1*		*7*	4	*14*	9
FROM STATES AND TERRITORIES OF THE UNITED STATES.								
Arizona	*3*				*2*	1	*5*	1
Colorado	*7*	11	*1*	2	*5*	1	*13*	14
Hawaii	*5*	4		1	*2*	1	*7*	6
Idaho	*1*	1	*1*		*2*		*4*	1
Illinois	*5*	3			*3*	1	*8*	4
Indiana	*2*	1				1	*2*	2
Iowa		6						6
Kansas	*1*	1			*2*		*3*	1
Maine			*1*				*1*	
Massachusetts	*1*	4			*1*	1	*2*	5
Michigan	*1*	4				1	*1*	5
Minnesota	*2*	1		2	*1*		*3*	3
Missouri	*2*	1	*1*		*2*	2	*5*	3
Montana	*3*	5			*1*		*4*	5
Nebraska	*1*	6			*1*		*2*	6
Nevada	*2*	2					*2*	2
New Jersey						1		1
New Mexico	*2*	3					*2*	3
New York	*2*	1	*1*				*3*	1
North Dakota						2		2
Ohio		2	*1*				*1*	2
Oklahoma	*1*						*1*	
Oregon	*8*	11	*3*		*4*	1	*15*	12
Pennsylvania	*1*	1					*1*	1
Philippine Islands					*2*	1	*2*	1
Rhode Island		2						2
South Dakota		2						2
Texas	*1*		*3*			1	*4*	1
Utah	*2*	3		1	*3*		*5*	4
Vermont	*1*	1					*1*	1
Washington	*9*	23	*1*			1	*10*	24
Wisconsin	*2*	2					*2*	2
Totals	*66*	106	*14*	6	*38*	20	*118*	132

TABLE II. ENROLLMENT IN COLLEGE.

		Regular				Limited				Special				Enrollment				Totals	
		Men		Women		Men		Women		Men		Women		Men		Women			
		'01	'02	'01	'02	'01	'02	'01	'02	'01	'02	'01	'02	'01	'02	'01	'02	'01	'02
Letters	'01	*21*		*43*		*2*		*3*		*1*				*24*		*46*		*70*	
	'02		19		49						1		3		20		52		72
Soc. Sciences	'01	*53*		*150*		*15*		*36*		*16*		*55*		*84*		*241*		*325*	
	'02		77		182		2		12		9		28		88		222		310
Nat. Sciences	'01	*29*		*17*		*7*		*6*		*6*		*6*		*42*		*29*		*71*	
	'02		30		31		4		1		1		4		35		36		71
Commerce	'01	*16*				*4*				*2*				*22*				*22*	
	'02		36								4				40				40
Agriculture	'01	*3*				*2*				*15*		*3*		*20*		*3*		*23*	
	'02		13		2						15				28		2		30
Mechanics	'01	*63*				*7*				*4*				*74*				*74*	
	'02		61		1		1				9				71		1		72
Mining	'01	*72*		*1*		*5*				*16*				*93*		*1*		*94*	
	'02		97				2				13				112				112
Civ. Eng.	'01	*30*		*1*						*10*				*40*		*1*		*41*	
	'02		50				4				7				61				61
Chemistry	'01	*34*		*7*		*1*		*2*		*3*		*2*		*38*		*11*		*49*	
	'02		35		7						4		3		39		10		49
Totals, '01		*321*		*219*		*43*		*47*		*73*		*66*		*437*		*322*		*769*	
				540				*90*				*139*				*769*			
Totals, '02			418		272		13		13		63		38		494		323		
					690				26				101				817		817

THE NEED OF A UNIVERSITY HOSPITAL.

Ever since the re-organization of the Medical Department of the University was undertaken, the lack of clinical facilities in the shape of a teaching hospital has been apparent. It became clear that the improvement must cease with the first two years of medicine unless adequate material could be supplied for instruction in the clinical branches. Believing that it needed only a frank statement of the needs and aims of the Department to win the hearty coöperation of the public, a committee was appointed to prepare a statement concerning the existing clinical facilities in San Francisco, especially with reference to the educational needs of the University. With confidence, therefore, this report is given to the public in the firm belief that they will generously coöperate with the University in its effort to obtain for the city an institution which means so much to the poorer classes and to the development of the University in its effort to provide for the education of those to whom the health of the community must in future years be entrusted.

The best hospital authorities in the world have agreed that large communities should have four free hospital beds to every 1,000 inhabitants, and as the population of San Francisco at the present time is at least 400,000, the number of free beds there according to this method of calculation should be 1,600. Moreover, there is an additional population of about 150,000, living in the environs of San Francisco, which makes demands on the public hospitals of the

city because these districts are totally unprovided with institutions of that nature. Attention should perhaps be called likewise to some features of the civic life in San Francisco which make a general rule such as this more or less inappropriate, for we have here large maritime interests, a great cosmopolitan population from the continent, and a larger number of natives of the Orient than any other city or state in the Union. It is, of course, obviously necessary to provide on this account hospital facilities in excess of those ordinarily demanded by a community of this size, that sailors, foreigners, and celestials who dwell within its limits may receive, when occasion demands, adequate hospital care. To meet these extraordinary requirements the following accommodations are at present available:

1. City and County Hospital.....400 beds
2. St. Luke's Hospital.....6 beds
3. Children's Hospital.....40 beds
4. Woman's Hospital.....8 beds

In view of these facts it appears that the needs of the community demand provision for over one thousand free hospital beds in excess of those already available. Certain commercial considerations, too, have an important bearing on this question. The future development of the tremendous sources of natural power on this coast, for example, means an inevitable increase of manufacturing interests. This, with the growth of great commercial projects, will yield large increment to the classes that need the advantages of free hospitals. A glance at this table emphasizes the immense disproportion existing between the available facilities and the pressing need for them. And, if necessary, such statistical evidence can be augmented by a study of the conditions at the present City and County Hospital, which is unsanitary and cheerless; where the deserving poor who seek relief from suffering cannot find health, comfort, or nourishment. The average cost of one patient a day in the large public hospitals of New York is $2.30, while in the City and County Hospital of San

Francisco the average is sixty-six cents a day. If in addition to the disproportionate number of beds we consider that the facilities available are so hopelessly inadequate, the reasons for establishing suitable ones become only more apparent. Although it is true that the Board of Supervisors plans within the next few years the erection of a larger hospital, more adequate to the needs of the city, the total number of beds will even then be far below that which experience and the actual conditions demand. It is apparently easier to get, by legislative processes, funds for the erection of buildings required for hospital purposes than it is to maintain them. And as the new hospital is to be built from a special tax levy or bond issue, the increased number of beds will not be accompanied by any proportional increase in the hospital budget, so the present rate stands a greater chance of being diminished than increased by the extra demands that will be made on it. Most communities of the size of San Francisco have, besides hospitals supported by the city, a number of large institutions erected and supported by private endowment. Here there are no such secondary hospitals at all commensurate with those in the eastern cities. It is only necessary to mention the Johns Hopkins Hospital, the University of Maryland Hospital, the Children's Hospital in Baltimore; the University Hospital, the Children's Hospital, the Pennsylvania and the Weidener hospitals in Philadelphia; the St. Luke's, Mercy, Baptist, Presbyterian, Alexian Brothers' hospitals in Chicago, and the score that exist in New York, to show how curiously private philanthropy in California has never been directed to this most desirable end.

In order to supply this real want, there can be no better way than the erection of a hospital in connection with the University, where the ideals and interests of the one will be reflected in the other, and where the sick poor may not only receive the best of treatment, but also contribute healing truths to mankind. Here, a group of men devoted to humanity and science may at the same time relieve

suffering and study the cause and nature of disease. Moreover, not the least of the functions of such a hospital is to provide opportunities for the training of young physicians who will finally measure up to the best standards of the University.

ADVISABILITY OF UNIVERSITY CONTROL.

During the past fifteen years there has been one marked tendency in medical education, and that is the transfer of the medical schools from private and corporate boards to the University. This fact has recently been emphasized in an article by President Harper of the University of Chicago, in which he speaks of this not only as a past tendency, but as the line along which the immediate growth of medicine is to come. This, he says, must be obvious because the ideals of the University are higher than those of the profession at large. Similar sentiments were expressed by David Starr Jordan in his last Commencement address, and President Wheeler has repeatedly in numerous public and private statements committed the University of California to this policy. Of course the movement is strictly confined to America, for in France and Germany, where the leading scientific and medical institutions of the world are found, a separation of medicine from the University has never existed. On the Continent they have developed side by side, and this fact alone has been responsible for their great pre-eminence and remarkable productivity. All of the factors responsible for the development of the efficient University system of Germany have acted and reacted upon medicine, since according to the Continental idea it has always been regarded as an organic part of University life. In Germany all civic and most private hospitals are under the control of the Universities and are administered by them. Viewed, then, either from the history of the past or the prospects of the future, medicine, in reality, always was and always will be an integral part of the university. And so the separation of the two existing

in this country has been purely arbitrary and may be viewed simply as an expression of our peculiar educational conditions.

In the foundation of a hospital it is furthermore essential that there be some assurance of permanence, some certainty that a good policy, once inaugurated, will be carried on in perpetuity. No more definite means of accomplishing this desirable result can be obtained than by putting these institutions into the hands of the University where the University trustees or University Regents can easily effect its administration side by side with that of the institution they govern. The fact that the University already has an administrative board is not to be overlooked, because a marked decrease in the expense of conducting a hospital thus becomes possible by simply incorporating it into the general administrative machinery of the University. Furthermore, even with a great initial foundation it is always possible that the growth of the city and the State may finally render it inadequate to their needs. And so the fact that philanthropy is usually directed to the ends of education gives a certain assurance that its ultimate growth and productiveness will best be safeguarded by putting it under the control of an educational body. In this country it seems at first a curious fact that patients receive the best treatment in those hospitals where the most scientific work is done, and that the efficiency of the hospital varies inversely with the amount of research and investigation that is carried on in it. An analysis of the conditions easily explains the facts. The University naturally attracts the brightest minds of the profession, and the highest aim of scientific medicine is to attain perfect results, that is one hundred per cent. of cures, and since we have scientific men and scientific ideals working for this same end it is only reasonable that a result at first sight, perhaps, curious, should naturally and inevitably follow.

CONSTRUCTION.

The hospital should be built on the so-called pavilion or unit system, which provides not only the maximum amount of light and air, but for future growth and expansion as well. To make this possible, the site on which the hospital is erected must, of course, be adequate. As an adjunct to the hospital there should be a large dispensary located in the heart of the city, conducted by the hospital staff, for ambulatory cases. This permits patients with minor ills to be treated near or in their own homes, and only the severe cases of sickness need then be sent directly into the hospital wards. This accomplishes, moreover, a two-fold result. A downtown dispensary enables the hospital, if desired, to be placed in the more outlying districts of the city, in an environment better adapted to its needs. In such a location it is isolated from the dust, smoke, and noise of the more densely populated centers of the community.

Concerning the details of the construction, it can be laid down as axiomatic that while the buildings should be imposing and worthy of the University, nevertheless, unless ample funds are available, all unnecessary expense of exterior decoration should be sacrificed in order that the money should be spent on what will add directly to the comfort and health of the patients, that is to say, on durable interior finish, adequate equipment in the way of apparatus, furniture, linen, instruments, etc., and in modern hospital facilities calculated to minimize the cost of administration. Fortunately, in erecting a hospital on the unit system even when buildings of the plainest description are used, the arrangement of the roof lines can be so carried out as to create an imposing, effective and pleasing group of structures. At any rate, where decoration is for any reason deemed advisable, this can be placed on the one exposed façade of the hospital buildings, and everything else so grouped behind it as to expose only the graceful lines of the wards.

The main axis of the hospital lies north and south, allowing the sides of the wards to face east and west, yielding a maximum daily exposure to the sun. The different units composing the hospital are connected by a covered passageway under which is a conduit for the transmission of heat, light, and power to the different portions of the hospital. Overhead this passageway is protected by an awning, making it serve as an open air solarium where patients may be exposed at the will of the attending physicians. The main façade of the hospital is composed of two large central buildings, flanked on either side by private wards. One, the training school for nurses, contains class rooms and dormitories for the nursing staff, while the other, a main administration building, contains offices, apartments for the superintendent, and rooms for the resident staff.

Behind the administration building and the nurses' home are the ward buildings, composed of pavilions two stories high, each ward accommodating between thirty-five and forty patients. The end of the ward faces the north, and contains nurses' rooms, lockers for patients' clothes, linen closets, lavatories, and ward dining room, as well as three or four private rooms for cases that are gravely ill, or for one reason or another need special isolation. At the end of the main ward, which faces south, is situated a specially constructed glass solarium with patent windows. Here convalescent cases can be kept entirely in the sunlight, and if necessary this room can be practically thrown into the open air. Of course the second story of each ward building connects with the covered way, making it possible to wheel the patients either in chairs or in their beds directly into the open air, where it is expected that many of them will pass the larger portion of the day.

Immediately behind the row of pavilions on either side of the axial passageway, the kitchen and heating plant are placed, as near the geographical center of the hospital as possible. Thus the food is distributed with a minimum

loss of time and hence retains just so much longer its palatability. The heat, light, and power for the same reason are conducted around the hospital with a minimum loss of efficiency either through radiation or resistance. In order to avoid a nuisance from the location of the heating plant and power station, the smoke and gases are conducted in an underground conduit to a point some distance behind the main hospital, where it terminates in a stack which provides the necessary draft. The kitchen, bakery, and laundry are directly opposite the power-house, and will be provided with all the modern improvements necessary to furnish food in large quantities in a palatable, nutritious form. Underneath the kitchen there is a freezing plant, enabling the hospital to buy meats and perishable provisions in great quantities and to preserve them for an indefinite period. This feature permits the administration to obtain the supplies at times when the market prices of such commodities are low.

Behind the hospital, located east from the main corridor, is the surgical and laboratory building. This contains a large amphitheatre built chiefly of glass to provide adequate light for the operations that are conducted therein. Besides this there are several smaller operating rooms adapted to special work, and especially some for infected cases. The remainder of the building is occupied by teaching rooms for courses in clinical microscopy, clinical chemistry, and clinical physics, as well as the private research rooms necessary for the departments of medicine, surgery, gynecology, and obstetrics. In this building is a very elaborate photographic *atelier*, where permanent pictorial records of the more interesting and rarer cases are taken. Connected with this studio is a room provided with a modern X-Ray apparatus. On the surgical end of the building a special splint and apparatus room for orthopedics is to be installed. The portion of the hospital opposite the clinical laboratory and amphitheatre consists of the pathological building with an exposure room, autopsy

room, and separate rooms for bacteriology and gross pathological demonstrations. A separate brine pipe from the freezing plant conducted to the exposure room permits the refrigeration of the bodies immediately after death until they are prepared for burial. This valuable feature of construction prevents decomposition, and will also prove of inestimable value in the preservation of organs for the pathological demonstrations. At the other end of the building is located a laundry having a capacity of 1,500 to 2,000 pieces a day, provided with machinery of the newest pattern for the efficient, economical washing of the hospital linen. A special room will be maintained here for the sterilization of all hospital material that, in one way or another, may become infected. Between the laundry and the pathological building space is provided for an ambulance, although it is hoped that during the first years of the establishment of the hospital this expense may be saved by the utilization of the public ambulances.

The cost of erecting a hospital of this nature would be at least four hundred thousand dollars; but this amount, it must be understood, would provide the very best materials, that is, brick walls, steel construction, and fire-proofed wards. Following is a tabulation of a contractor's estimate, made without competition from specifications provided by the architect:

Buildings.	*Cost*
Administration building. 30x200, 3 stories and basement	$51,000
Training school. 30x180, 3 stories and basement	46,500
Regular Wards. 240 beds. Front part 60x30, 2 stories and basement, ward part 24x120, 2 stories, basement, and attic	132,000
Power house. 30x60	6,000
Laundry and kitchen. 30x100, 2 stories and basement	22,500
Pathological building. 30x60, 2 stories and basement	31,000
Class room building. 40x180, 2 stories and basement	62,000

Circular operating room. 40 ft. diameter basement and 20 ft. story	6,900
Isolation ward. 30x80, 1 story, basement, and attic	17,000
General grading roads and pavement	5,800
Smoke stack	2,500
Terrace wall 1200 feet, 12 feet high	10,800
13,333 yards filling	2,500
700 feet arcade 20 feet wide, 17 feet high	10,000
500 feet arcade 20 feet wide, 17 feet high	6,000
Total	$ 419,700

It is possible that this amount might be diminished owing to the fact that the University of California can obtain free stone, free brick, and free transportation, to the site of the hospital. However, there are also two ways of lessening the initial expenditure: One would be to employ cheaper materials in construction, the other and better to erect, at first, only certain units of the hospital buildings while adhering in the end to the original plan.

COST OF MAINTENANCE.

Following is a list of the cost of maintenance in seven of the large hospitals in America for each in-patient per day:

1.	New York Hospital, New York	$2.84
2.	Roosevelt Hospital, New York	2.34
3.	Boston City Hospital, Boston	2.12
4.	St. Luke's Hospital, New York	1.82
5.	St. Luke's Hospital, Chicago	1.80
6.	Sloane Maternity Hospital, New York	1.66
7.	Johns Hopkins Hospital, Baltimore	1.36

A study of this table shows that the average cost per in-patient per day in seven of the leading hospitals is $1.74. The expense of maintenance, moreover, is greatest in the public hospitals, a condition easily understood from the fact that all public institutions are more or less subject to political influence, and therefore not conducted as cheaply and

efficiently as those under the control of private bodies. Furthermore, it seems that the running expense is least in the Johns Hopkins Hospital, where the treatment is also best. This is due partly to the fact that food, labor, and supplies are cheaper in Baltimore than in many of the other large cities, and partly because the University trustees have established a remarkably effective system of hospital government, which the University of California plans to inaugurate in its own hospital. In California some supplies are cheap and plentiful, while others are dear. Labor in the East is cheap, while in California it is excessively expensive. It is probable, however, that notwithstanding these facts, an effective and efficient hospital of 240 beds could be maintained for $1.40 per day for each in-patient. This would mean that the entire administration of such a hospital would cost approximately $130,000 per annum.

The following tabulation of the running expenses of a hospital of the type planned for the University is based upon the experience of the United States Government in maintaining a hospital of 400 beds upon the Presidio Reservation. This institution has been splendidly managed by Col. Girard, now Assistant Surgeon-General in Washington. It represents in equipment and efficiency all that the University of California requires in its own hospital. Thus we have here for purposes of direct comparison, a hospital conducted and managed in the same environment and under the same conditions as the future University of California Hospital must be maintained. In computing the cost of maintenance, due allowance has been made for the difference in the size of the hospitals, and the fact that the Presidio Hospital is constructed of wood and therefore requires a larger heating plant. Correction is also made for certain conditions in the running expenses resulting from the large amount of clerical work necessitated in a military hospital in order to protect the Government against fraud on the part of unworthy soldiers who may apply for pensions.

COST OF MAINTENANCE OF UNIVERSITY HOSPITAL.

Kitchen.		
1 Chief Cook	$ 720 00	
5 Assistants	2,100 00	
Food and supplies uncooked:		
Patients	35,000 00	
Doctors and Nurses	8,760 00	
Orderlies	1,825 00	$48,405 00
Heating Plant.		
1 Chief Engineer	1,200 00	
1 Assistant Engineer	960 00	
3 Firemen	1,540 00	
Coal	15,000 00	18,700 00
Laundry.		
1 Laundryman	$ 660 00	
2 Laundrywomen	600 00	
3 Helpers	900 00	
Supplies	1,000 00	3,160 00
Nurses.		
1 Superintendent of Training School	1,200 00	
12 Head Nurses at $40.00	5,760 00	
68 Pupil Nurses, maintenance, etc	3,000 00	9,960 00
Orderlies.		
25 Men at $337.00		11,000 00
General.		
Office staff, administration, general expenses, supplies, etc	$32,550 00	
Repairs and renewal of equipment	8,000 00	$40,550 00
		$131,775 00

So if the entire plan was to be put into operation at once a sufficient amount to secure an annual income of over one hundred thousand dollars a year would be necessary. The principal, safely invested and yielding a safe revenue, would mean approximately two millions of dollars. While this plan represents the real needs of the University, it is also

just as easy if funds are available to inaugurate it on a larger, more extensive and, therefore, more effective plan.

DESIGNATION.

The hospital could be entitled

The ..... Hospital of the University of California,

or

The Hospital of the University of California.

Founded by.....

It is the idea of the Committee having the solicitation of the funds in hand that the gift of a large initial sum of money would not only be an effective means of calling attention to this civic and educational need but would be the greatest stimulus for further philanthropy along these lines. This is emphasized in the recent experience of Harvard University, where, by an initial gift of one million dollars, some five millions were raised for the endowment of the first two years of medicine alone. Experience in Chicago, Johns Hopkins, and other universities supports this view. Under any circumstances it would be used as the basis of a further appeal to the friends of the University in this State to give more extensively to this project. New wards, laboratories, beds, etc., added to the original foundation might be designated by the names of their donors or utilized as memorials.

PLANS OF A GREATER SCOPE.

For the sum of three million dollars it would undoubtedly be possible to erect and maintain in California a hospital plant equal to that in Baltimore under the control of the Johns Hopkins University. This was the amount given by Johns Hopkins twenty-five years ago for the establishment of the hospital which bears his name. No other one thing has done so much for medicine as this one gift, no other ten million dollars expended on various

hospital projects have accomplished more, for the simple reason that the control and direction of these funds were placed in the hands of a University with high ideals and the money was made to administer to the needs of education as will as to the wants of humanity. For five millions it would be possible to duplicate the plan of the hospital that Harvard University has projected. A hospital established on such a basis would materially aid the University to extend its usefulness, besides accommodating a far greater number of patients. The University would then be free to call to the clinical chairs the best men in the country, and offer them, in the shelter of its walls, an opportunity to devote their lives to the treatment of the sick, the teaching of students, and the solution of some of the perplexing problems in medicine. The elaboration of the possibilities of such a foundation would take more space in such a description as this than even the brightest prospects of its attainment seem to justify, but this much can be said, that all and not part of the conditions considered under the head of the future of university hospitals could then be realized.

EXTENT OF HOSPITAL PROJECT.

The minimum requirements of a hospital suited to the needs of the University on this plan would be 240 beds. While this would aid materially in relieving the congestion in the present hospitals, still its most potent influence would consist in the general effect produced by a single well-conducted hospital. Efficient methods of control and administration, new plans of treatment and work always exercise a great influence on other neighboring institutions, because hospitals, like corporations, are, to a certain extent, affected by the laws of competition. This hospital, furthermore, could be made the medical center of the State, and with a progressive staff and a high standard of work, its influence would soon be felt throughout California.

It is understood, of course, that the hospital is for the acute and not the chronic sick. Assurance of the greatest

usefulness of each bed is thus given according to the principle of the greatest good to the greatest number. Surprising as it may seem, 4,500 different patients occupied the 330 beds of the Johns Hopkins hospital last year. While it is recognized that adequate provisions should be made for chronic cases, the community demands, at present, an effective hospital for the great number who are urgently sick but not incurable. If sufficient additional funds can be obtained it might be wise to establish, in connection with the hospital, a home for incurables, and a large isolating hospital for tuberculous patients.

EDUCATIONAL NEEDS.

It goes without saying that a hospital of the scope thus planned must be provided with adequate laboratory facilities and suitable class rooms in order to utilize its material for teaching purposes. This is, in fact, the only return that the patients make for the money spent in their care. It means, furthermore, that they also contribute to the sum of our knowledge concerning the causes of disease, and thus enable the University not only to train young physicians, but to aid in the amelioration of the various conditions from which the people suffer. Experience has shown, as for example, in the Johns Hopkins Hospital, that, when properly handled, not only the poor patients lend themselves gratefully and willingly to this end, but even those who pay all or part of their maintenance are often only too glad to assist personally in the instruction of students. Thus far we have only spoken of the educational needs of universities in general for medical training.

To understand the real conditions which make it essential to have on this coast in connection with the University of California a large University Hospital, one must recapitulate briefly some of the recent history of the medical school. About four years ago by a combined action of the Board of Regents and the Faculty of the Medical Department, certain steps were taken which looked toward the

improvement of the medical course offered in the Department of Medicine, which was then simply affiliated with the University. About this time the new buildings provided by the State for the Affiliated Colleges were occupied. The policy gradually crystallized, and the Faculty called to the Chair of Pathology, a teacher who was to devote his entire time to teaching and original investigation in the general field of pathology. Mrs. Hearst had personally interested herself in the advance of medicine and offered to equip the new department. Accordingly some $24,000 were spent on a complete set of modern apparatus, which made the new department, in a material sense, one of the most nearly complete in the country. In the fall of 1901 the Board of Regents of the University for the first time took a formal action looking to the improvement of the Medical Department by the establishment of a department of Anatomy, which was to be maintained from the general University budget and designed to be a general University department controlling and directing all of the work in Anatomy offered in the University curriculum. Again Mrs. Hearst and the administration of the University by the thorough equipment of the new department contributed much to its effectiveness. During the first year of its establishment the Department of Anatomy spent some $13,000 in the reconstruction of the laboratory and on equipment and library. At the budget meeting in June, 1902, the Board of Regents voted to organize a University Department of Physiology on a basis calculated to make it one of the best in the United States, with the understanding that the work in Pharmacology should be allied to Physiology. In the establishment of this new branch the University will again be indebted to a private benefactor, for Dr. M. Herzstein, of San Francisco, has generously agreed to equip the new Department in a modern way. It will thus be seen that during the past three years the Board of Regents has established almost the entire work of the first two years of medicine on an academic basis, which

means that the men who teach these branches give their whole time to instruction and research. Furthermore, one of the most encouraging prospects for the future is that each year witnesses a larger number of people interested in the work and welfare of the Department, and this interest expresses itself in substantial aid and generous contributions for the work of medicine. At the present time, the medical school occupies grounds and laboratory buildings worth about $500,000, possesses a modern equipment worth $60,000, and contains the nucleus of a splendid medical library. Now, in keeping with the material development of the Department, certain radical modifications in the methods of instruction have been made which are calculated to place its pedagogy on a par with the best Eastern institutions. In this matter the Faculty has had the assistance and advice of the most prominent medical educators in the East, and, so far as they have been able, have selected the best ideas from the several leading institutions, avoiding, where possible, what experience has shown to be unfortunate educational principles. In this connection may be mentioned the fact that the Faculty, in 1904 or 1905, will demand from all the students who enter the Department two years of preparatory work in a college of recognized standing. Although it is true that this time will be largely spent in special courses preparing the incoming students for the work of scientific medicine, they are urged to elect also work in the line of general culture, because the University is impressed with the fact that physicians of the next generation need above all men, not only the best possible training, but the highest standard of culture as well. No other group of men come into such close contact with the people or can wield more influence for the right standards of life. It is to these men, moreover, that we must look for the solution of problems of public hygiene and the care of the community. Furthermore, the work of teaching has been so concentrated that the courses offered by the several departments in medicine are given in single block periods,

and the student accordingly is enabled to gain whatever advantage accrues from sustained concentrated effort. Realizing, too, that the newer methods of teaching mean giving the student the power of obtaining and testing knowledge for himself rather than the mere facts in a form in which they can simply be absorbed, the work, so far as possible, is of a practical nature and given either by the laboratory or bedside methods. These facts as stated above bring us face to face with the problem of adequate clinical facilities for the training of physicians in California in the real sense of the University. It must be obvious that with the first two years of medicine on an academic basis, students will find and do find inadequate the present hospital facilities at the disposal of the University authorities. During their clinical years at present the Department has to rely for the purposes of clinical instruction solely on the material afforded by the present City and County Hospital, which is both inadequate to the needs of the University, and so far beneath the civic dignity of San Francisco that the demand for an institution built and supported by private endowment controlled by the University and maintained according to the highest standards, must be apparent.

That this appeal to the friends of the University is not without precedent is evidenced by the erection and endowment of the Royal Victoria Hospital in Montreal, simply to provide the Medical Department of the McGill University with clinical facilities and opportunities for the proper training of its medical students. Lord Mount' Stephen gave $750,000 for the construction of this hospital, and with Lord Strathcona, provided the endowment necessary for its maintenance. At present, students desiring the best clinical training are forced to go to the eastern medical schools because there is a lack of hospital facilities in California. For a number of years many graduates from the University of California and Stanford have left the Pacific Coast on this account. There should be on this side of the Rocky Mountains every opportunity for the training of the best class of physicians.

Aside from the educational value and civic need of a good hospital in San Francisco, one of the most potent reasons for its construction and endowment arises from the recent acquisition of the Hawaiian and Philippine islands by the United States. It emphasizes, furthermore, why it should be placed under the control of the University. The inevitable increase in trade between California and the Orient is certain to make San Francisco the great seaport for oriental commerce. This growth in the ocean traffic suggests a constant menace to the health and safety of the city and the State because of the possible introduction of dangerous tropical diseases. The future physician in California should be able to recognize and treat the ailments common to the Orient and those lands with which we have commercial relations in order to prevent the spread of epidemics. The plain truth is the situation demands that the University should establish a school of Tropical Medicine in connection with the medical department, and that a portion of the proposed hospital should be devoted to a study of cases of this nature. The wisdom of this plan is shown by the successful results following the introduction of similar institutions in England, namely at London and Liverpool, the insular termini of Great Britain's oriental commerce. Aside from the protection assured by their existence, they have been of great assistance in solving epidemiological and hygienic problems that arise in the British colonies.

POSSIBILITIES OF THE FUTURE.

The growth of medicine in the last fifteen years has been little short of phenomenal. A few men have gone abroad, chiefly to Germany, and there received the spark of inspiration with which they have kindled the fires on our own altars. Laboratories were established, improved methods of teaching instituted, hospitals erected, and young physicians given opportunities for real training, until at present in the best centers of medicine in this country we have some medical schools which compare favorably with

many of those in Europe. But in all these changes and in all these improvements we have done nothing but imitate the best which exists abroad. There remains one great contribution for America to make to the medicine of the world, and that can only be done by a University through its hospital. During the period of transition of which we have just spoken medical schools were neither endowed nor did they receive, as they do in Europe, funds for their support from the State. For sustenance they depended entirely upon the fees of students, and men who taught without compensation were compelled to look to the practice of their profession for a living. All honor is due those who, from a real interest in science, have devoted time and energy to the cause of medicine and have contributed so much to the advance of medical education. They received nothing from the school except whatever increase of practice might result from their connection with it. With the absorption of the medical schools into the Universities the methods of University instruction have been applied to the medical branches, and the increased demands on the teaching staff, together with the introduction of the research idea, have been satisfied only by having instructors devote their entire time to the work of teaching and investigation. Men in practice are no longer able to satisfy the requirements of a high grade medical school in carrying on the work of the scientific branches. Following the introduction of the graded system and the complete adoption of University methods, appointments are now made in the subjects covering the first two years of medicine just as they are in other departments of the University. As the improvement reached the hospital years of the medical course, occupants of the Clinical Chairs in the leading Universities began to receive some compensation, but inasmuch as men of the type required for this work represent an earning capacity of many thousands of dollars a year, they still were and are allowed to carry on their practices in one form or another. The University idea has penetrated so extensively into

medicine that the time is coming shortly when we shall see the clinical chairs occupied by those who devote their entire time to instruction and research and the treatment of patients in the hospitals of the University. Indeed, it is not improbable that in the near future one of the large eastern medical schools will inaugurate this plan. The University of California could not have any greater honor than to be the first to conduct its hospital and hospital courses on this basis. This, moreover, will be the policy of the University if sufficient funds can be obtained to justify its introduction. The results of the system are obvious: patients in the hospitals receive the entire time and attention of a highly trained and organized staff who, besides this one duty, devote the remainder of their energies to scientific pursuits and the routine work of teaching. The clinical departments will thus become productive departments of the universities, and the consequent increased volume of research will be directed entirely to the solution of problems which mean so much to the health of the community and the release of humanity from its sufferings. Not the least of its advantages is the opportunity afforded for the training of exceptionally gifted men in regularly organized university departments where places can be awarded simply on a basis of promise and merit.

During the last twenty-five years one of the most impressive features of the development of university life, particularly in Germany, has been the extramural system. In the assimilation of the Medical Department the University of California has pledged itself to that principle, and inasmuch as this feature will play a large part in the development of medicine and the university in America, the University of California should apply this system in medicine just as far as it is deemed advisable. It means that the degree of a university has only in the slightest way any geographical significance. The university sets the stamp of its approval upon a certain type of man and a certain quality of work. These men can be trained and this work

given in any place where the university can have absolute control. Naturally, in the development of a hospital scheme of such size as this one, the present Faculty will have to be enlarged in order to carry on the training of its regular students of the University. It should be, furthermore, the plan of the University to take even a broader policy, and accept the obligation of administration wherever adequate clinical facilities can be obtained, and in these places install instructors and offer courses. This broader extramural plan means that the medical group will then represent a larger number of men and a greater and wider number of interests. Furthermore, this extends the influence of the University, an end to be desired if the institution can guarantee that its product will be good and efficient work. The plan for the development of the University Hospital is based on the newer scientific development of medicine, but science in this sense should not be construed as a heedlessly impersonal idea, careless of the needs and sufferings of humanity, but rather as the one thing which will do much to make the prevention of these conditions possible.

BENJ. IDE WHEELER, Chairman,
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Committee.

THE FACULTY CLUB OF THE UNIVERSITY.

By Lincoln Hutchinson.

The phenomenal development of American universities and colleges in the last few decades has brought with it a series of new problems, among which not the least important is the increasing difficulty of amalgamating the diverse interests to be found in these highly developed institutions. The problem arose first among the student body. In the early days, when the entire enrollment of students reached but a few score, the college as a whole constituted a natural unit. Every man knew all the others, whether of the same class or not. The bond of union was close, and each student felt himself personally a member of the academic household. "College spirit" set the dwellers within the walls apart from the rest of the community.

With the growth of the college, however, increasing numbers introduced diversity of interest and made it impossible for the student to gain even a passing acquaintance with all his fellows. His circle was narrowed till it contained few save those with whom he was thrown into more constant contact, the members of his own class. The class became the natural unit, and "class spirit," with all its aberrations, was substituted for the older "college spirit." Further growth brought still further change. Now that the college has become a university, with a total attendance mounting into the thousands, and the enrollment of a single class well up into the hundreds, it is no

longer possible for any man to know all the members even of his own class. Some formal organization of the class has as a rule been kept up, though even that has been abandoned in some places. To the joy of some and the sorrow of others, the solidarity of the class has been broken up, "class spirit" has declined, and we are witnessing a gradual return to something which resembles the older college spirit, but which is planted on a much broader basis. Personal acquaintance being impossible, and the *esprit de corps* which comes from elbow-to-elbow touch and mutual acquaintance, a new bond has taken its place; loyalty to the University and its ideals has become the watch-word. "University spirit," coöperation of all factors and forces for the good of the whole academic body, is crowding out the remnants of the older "class spirit."

This evolution which has taken place in the student body is to-day finding its counterpart in the faculties of our larger institutions of learning. When the teaching force of the college numbered five or six or a score, common interest and personal association kept the men united in a more or less coherent body. There was no rigid separation into departments, and the interests of one teacher were easily seen to be closely dependent upon the interests of all. But the multiplication of "colleges" within the university, the expansion of the faculty into a great complex body of a hundred, two hundred, or more; the differentiation into well defined departments; the substitution of specialists for the "broader" scholars who could lecture with equal fluency on philosophy, science, history, or theology, have introduced a diversity of departmental interests in the place of the old simple, common faculty interests. More than this: the results of diversity of academic interests have been magnified by mere growth of numbers, the inevitable lack of mutual acquaintance, and the scattered residence due to expansion of the college village or town into the University town or city. It is now almost as difficult for the faculty man to get acquainted

with all his fellow-teachers as for the student to know all his fellow class-men. This results in a certain "cliquishness." It often disguises the community of interest which really exists and prevents coöperation in many cases where united action might be of invaluable service to the University and all its members.

In a University like our own conditions are such as to give peculiar emphasis to these difficulties. The rapidity of our growth has suddenly brought together from all parts of the country a large number of men of diverse training and tradition, with little in common save the mere fact that they are interested in higher education and receive their appointment and pay from one and the same institution. The evil has been emphasized by the neighborhood of larger towns offering greater facilities for recreation, amusement, and residence than the college town affords. Even the mere position of the University grounds, a broad wedge sundering the "north side" from the "south" has not been without its importance. These, and similar causes, have tended to prevent community of feeling and solidarity of interest, and that sort of association and good-fellowship which alone can transform a mere aggregation of specialists into a real academic "body politic."

Mark, I say have *tended* to prevent. That they have not, in fact, proved an insurmountable barrier to community of interest, is due to the presence of other forces. The mere fact that our University for many years stood alone on this coast, a vast stretch of continent separating us from the great institutions of the East, making us, so to speak, pioneers in a new country, has maintained a fair degree of consolidation in spite of the difficulties of the situation. It has at least kept alive a desire for closer union, which has cropped out from time to time for years past, in the form of suggestions for the founding of some common organization, for the establishing of some common meeting place for rest and recreation and mutual good fellow-

ship, where plans and policies affecting the University could be freely and informally discussed, where men could rub elbows and get clearer and closer views of one another than is possible in the deadly atmosphere of an ordinary "faculty meeting."

It would be difficult to say where or when was originated the suggestion that a "faculty club" be formed. Nor is it important that we should do so, for from the point of view just set forth, the club becomes the necessary outcome of the "logic of events." Several times in the past ten or a dozen years beginnings have been made, but for one reason or another the movement never got beyond the initial stages; the present movement is succeeding because the time is ripe for it. The germ of the organization is to be found in our University Dining Association. After the establishment of that association a handful of the faculty men usually gathered there for the noonday meal. At first there was set aside for them a separate table only, but as their number increased it gradually became customary to occupy a small room at the rear of the building. Later, improvements were made by the association, and there followed a more or less formal setting aside of a new and larger appartment, which came to be known as the "faculty room," where twenty or thirty men not only met for lunch but lingered for half an hour or more afterwards to smoke and chat. Thus was formed, in a purely natural way, the nucleus of a club. It was inevitable that, sooner or later, further development should be realized.

Last autumn a group of these men resolved to issue a call for a general meeting for the purpose of discussing the possibility of forming a broader, more definite, and more useful organization. The meeting was held at the close of one of the regular gatherings of the Academic Council, and a committee of seven was appointed to canvass the whole matter and report at a later date. This committee began their labors at once, and no sooner did they begin than they found abundant evidence that the

fields were white unto harvest. The response was hearty and almost unanimous. There were, to be sure, many differences of opinion as to what should be the exact nature and scope of the proposed organization, but scarcely a murmur of dissent was heard to the opinion that a club of some sort was needed.

Thus encouraged, the committee set to work to formulate a definite plan. The difficulties were by no means few. In so large a body as our present faculty, it was inevitable that there should be found many conflicting ideas as to the character of the club. Many of the men had had experience in other clubs and naturally leaned toward the form of organization with which they had been familiar. Some favored a full-fledged club with all accessories; others were for the utmost simplicity. Some desired full restaurant service and sleeping apartments, as well as recreation and reading rooms; others cared only for a simple place of rendezvous, or a nucleus for the encouragement of a few out-door sports, tennis, handball, etc. Some could easily afford a considerable initiation fee and monthly dues which should insure completeness of equipment and service, while others, with small salary and heavy household expenses, were obliged to keep an anxious eye on the purse-strings. Some wanted a broad organization which should include both town and gown, dreading lest the club should be too deeply impregnated with the academic atmosphere; while others would draw the line close about the college household and keep the club a "family" affair.

Such diversity developed a pretty set of problems. The club, to be a success, must appeal to as many men as possible. The ideal to be aimed at was to include every member of the teaching force and so to adjust details as to cause as little sacrifice as possible to the wishes of any individual. This necessitated mutual concession and compromise, and the readiness with which the adjustment was made testifies, as nothing else could, to the reality of the demand for the club. When the committee's report was made it met with

immediate response. Even those who at the outset thought it unwise to form any such organization at all, showed their generosity by expressing their willingness to coöperate. In a few weeks' time enough names had been added to the roll of membership to insure the success of the undertaking, and as soon as the necessary formalities could be gone through, a permanent organization was effected.

One of the most difficult questions with which it was necessary to deal was that of membership; should persons not officially connected with the University be included or not? There are men living in Berkeley and Oakland, who although not connected with the University in any official capacity, are nevertheless deeply interested in its affairs, men who would be an element of strength to any club; and a goodly number of our present members advocated their being invited to coöperate with us. On the other hand, many believed that the club could best fulfill its purpose and maintain its character as a "faculty club" if it were set a-going independent of any outside influence. It was an important question of policy and was much discussed. The result has been the adoption of a sort of compromise—a *modus vivendi*—with preference given to the opinion of those who desire to keep within the academic family circle. It was decided that no members should be included who were not officially connected with the University; on the other hand it was agreed to extend a welcome not merely to the members of the faculties at Berkeley, but also to all officers of administration of the University and all members of the Academic Senate, whether connected with the colleges at Berkeley or not. The constitution as finally adopted contains the following sections on membership: "Section 2. Officers of instruction in the colleges at Berkeley, officers of administration of the University, and other members of the Academic Senate resident in Berkeley, are eligible to active membership." "Section 3. Members of the Academic Senate of the University residing outside of Berkeley are eligible to non-resident membership." Non-resident members

are given the same rights and privileges as the active members, save only the right to vote or hold office. Both classes pay the same initiation fee (ten dollars) but the dues of the former are only one-half those of the latter, (six dollars a year in the one case, and twelve dollars in the other).

The government of the club is, by the constitution, placed in the hands of seven directors, elected annually by the active members of the club. To this board is given full control of the affairs of the organization, the election of officers from among their own number, and the appointment of necessary committees to attend to the details of administration, from among the general membership of the club. It seemed best, in a club springing up on new soil and under somewhat unusual circumstances, to have a centralization of power. The successful inauguration of such a scheme will necessarilly involve a great many questions of detail which cannot at present be foreseen, and the settlement of such details seems more likely to be effected without friction or delay if put into the hands of a small board than if dealt with in a more democratic fashion. It is possible that in time this feature of the organization may require considerable modification.

The final organization of the club was effected at a general meeting called for that purpose on March 10 of this year. At that meeting a constitution was adopted and a board of directors for the first year elected. The Board at once took up the work of getting the club into operation. The first step was to make a canvass for members, and the results have been most gratifying. A careful estimate of the probable expenses of the club showed that success might be assured if a membership of one hundred could be obtained. Already the roll includes one hundred and twenty names (one hundred and ten active, and ten non-resident), and the prospect is bright for an increase to one hundred and fifty before the close of the present academic year. Very early in the discussion of plans it was decided, for the sake of getting immediately available funds, to establish a

limited number of life-memberships (fifteen) at one hundred dollars each. This list is already complete, and the life-membership fee has now been raised to one hundred and fifty dollars. Another encouraging feature of the membership is the response from the Regents of the University, five members of that Board having already identified themselves with us, and the probability being that several others will soon do likewise.

In other ways, also, the friendliness of the Regents toward the new organization has been shown. When application was made to them for the setting aside of a portion of the University grounds for the use of the club, consent was readily given. Again, only a few days ago, the possibility of an improved restaurant service for the club was realized through a generous appropriation for the enlargement and improvement of the University Dining Association and the construction of a connecting passage way from the Association kitchen to the new club house.

In pursuance of the authority given them the Directors have erected the building now nearing completion on the site set aside for the club by the Regents. As the work has progressed considerable expansion of the original plans has become possible. The original scheme did not include bed-rooms in the building, as it seemed unlikely that sufficient funds would be available for such a purpose. It was soon found, however, that a small group of members were sufficiently desirous of residing at the club to be willing to assume the responsibility of financing the enterprize, provided suitable arrangements could be made with the club. The matter was discussed at a general meeting, and the Directors were authorized to amend the original plan by adding a limited number of bed-rooms, provided some arrangement could be adopted which would place no additional financial burden on the club.

In accordance with this authorization, a second building has been constructed in connection with the first, the entire lower floor of which is to be devoted to general club uses,

while the upper floor is to be occupied, for a period of ten years, by the men who have furnished the funds for the addition. This arrangement, it is believed, is distinctly advantageous to both parties concerned; the club gets largely increased facilities without assuming any additional financial burden; while the men who have furnished the funds get a ten-year right of occupation of extremely convenient and desirable quarters. It is to be hoped that in time other groups of members will be found who may think it to their advantage to make similar additions to the building.

The club house, when completed under the present plans, will be of considerable size and will offer numerous conveniences and facilities to the club members. Externally, the architectural *motif* is Spanish, including such features as tile roof and plaster walls. The arrangement is such that additions may readily be made from time to time, as the needs of the club may require, without destroying the architectural unity of the plan. As new buildings are added, they will probably take the form of wings, added in such a manner as to enclose a court or *patio* to the south of the present building.

The interior, aside from the bed-rooms which constitute the second floor of the western half of the building, contains four rooms. The main feature is a large Gothic assembly room, which ordinarily will be used as a dining room and general sitting room. This is so situated that meals may readily be served from the kitchen of the University Dining Association. The other rooms are a reading and smoking room, a billiard room, and a smaller apartment which will be fitted with shower baths and lockers for the convenience of those members who wish to engage in out-door sports. The total cost of this building, with its furnishing, will be about $7,700, of which the club as a whole provides for about $3,700, and the members occupying the bed-rooms about $4,000. The funds provided for the club have come in the main from initiation and life-membership fees, the only

financial obligation incurred being a long-term indebtedness of $1,000.

The equipment and service of the club can, at present, be spoken of only in the most general terms, as their nature to a large degree must depend upon the income which will be available. Dues are placed at the very moderate amount of one dollar a month, and the income at present in sight is a little less than one hundred dollars. It is hoped, however, that members may be offered the following facilities: an improved restaurant service; a reading room, provided with the more important current periodicals and newspapers; a billiard room with at least one, and probably two, tables; shower bath, lockers, and a tennis court for men interested in out-door sports; free telephone service, and the constant attendance in the building of one club servant. It may prove to be necessary to charge small additional fees to those members who make use of the billiard tables or lockers, and possibly also to those who avail themselves of the improved restaurant service, but these are matters of detail which cannot, as yet, be settled.

It is confidently expected that as the membership and income increase, new features may be added: more bedrooms, a card room, a writing room, handball court, and bowling alley. In time, too, it may be possible to establish a small library. All of these matters, however, must be left for the future to decide. After the club becomes fully established, additional funds will almost certainly become available.

The present membership numbers one hundred and twenty, of whom sixteen are life members; ninety-four, active; and ten, non-resident. Of the life members, fifteen have subscribed the life-membership fee, Messrs. Irving Stringham, W. A. Setchell, C. L. Cory, S. B. Christy, Benj. Ide Wheeler, John Fryer, M. W. Haskell, A. C. Lawson, W. A. McKowen, A. C. Miller, E. O'Neill, H. de H. Waite, R. J. Taussig, H. Morse Stephens, and Mrs. Phœbe Hearst; while one, Mr. B. R. Maybeck, has been

elected to honorary life membership in partial recognition of his efficient and valuable services in drawing the plans for the club house and supervising its construction. The Board of Regents is represented by five members: Mrs. Phœbe Hearst, President Benj. Ide Wheeler, and Messrs. R. J. Taussig, I. W. Hellman, and J. A. Waymire. Of the faculties of the Professional Colleges, ten members have already joined the club, and it is probable that others will soon follow their example. The Directors, in whose hands rests the administration of the organization, were elected at the first meeting, in March last, and reëlected at the first annual meeting on September 16, 1902. They are Messrs. Irving Stringham, W. A. Setchell, W. D. Armes, A. C. Lawson, W. J. V. Osterhout, H. deH. Waite, and Lincoln Hutchinson. Their officers, chosen from among their number, in accordance with the constitution, are: President, Irving Stringham; Vice-President, W. A. Setchell; Secretary-Treasurer, Lincoln Hutchinson.

There still remain eligible to membership about one hundred and twenty men, eighty as active, and the remainder as non-resident members, and as the usefulness of the club depends so largely upon a full representation of all departments of the University, it is greatly to be hoped that many of these will find it possible to cast in their lot with us.

Of the real usefulness of the new organization even in its present small beginnings, there can be no serious doubt. It will bring the members of the faculty into closer touch with one another and promote a healthful *esprit de corps*. It will make possible fuller and freer discussion of questions of academic policy, reduce the friction of differing opinions, and lighten the burden of committee work. It will bring about closer relationship and better understanding between faculty and officers of administration, help adjust the demands of one to the resources of the other, and make possible a unity of policy which at times, under our present arrangements, seems well nigh out of the question. It is hoped that the club building may become a sort of Univer-

sity "Exchange," a general *rendezvous*, a meeting place for committees and various faculty organizations, and above all a kind of faculty home, where men may come into close and frequent intercourse with each other, may learn to know one another, not merely as teachers of this or that specialty, but as human beings with common interests and ideals.

THE SUMMER SESSION.

By Leon J. Richardson.

The teaching force in the Summer Session of 1902 numbered fifty-two, and represented twenty-three departments of regular university instruction. This enumeration includes the work in biology carried on at San Pedro. Certain lines of teaching were reinforced by men from other institutions; thus in Philosophy we had Professor Josiah Royce of Harvard, and Professor James Mark Baldwin of Princeton; in Education, Dr. F. L. Soldan, of St. Louis; in English, Professor F. N. Scott of Michigan and Assistant Professor C. S. Baldwin of Yale; in Physics, Professor E. G. Merritt of Cornell; in Chemistry, Professor A. Lachman of Oregon; in Botany, Professor R. A. Harper of Wisconsin; in Agriculture, Professor W. A. Henry of Wisconsin; in Forestry, Professor B. E. Fernow of Cornell; besides a number of normal and high school teachers and librarians—the last named delivering lectures before the Summer School of Library Science. For a list of the Summer Session faculty and the courses offered, the reader is referred to the University of California Bulletins, New Series, Vol. III, No. 3. Some further idea concerning the character of the work as well as the attendance may be gathered from the following tables supplied by the Recorder:

STATEMENT OF INSTRUCTION AND ATTENDANCE IN THE SUMMER SESSION, 1902.

INSTRUCTOR	TITLE OF COURSE	Credit Value, Units	No. of Students	
			Enrol'd	Took Exam.
	PHILOSOPHY.			
Royce	1. Metaphysics	4	26	19
Baldwin	3. Mental Development and Evolution: A Course in Genetic Psychology	2	74	47
Baldwin	4. Psychological Conference	2	22	16
	EDUCATION.			
Soldan	1. School Administration	2	86	74
Soldan	2. School Instruction	2	74	53
	HISTORY.			
Stephens	1. The Enlightened Despots of the Eighteenth Century	2	142	98
Stephens	2. The History of the Writing of History	2	116	74
Babcock	3. Government in the United States	2	60	39
Babcock	4. History of the United States, 1820–1856	2	33	16
	POLITICAL ECONOMY.			
Plehn	1. Outline of Economics	2	26	20
Plehn	2. Industrial, Commercial, and Financial History of the United States	2	34	24
	GREEK.			
Allen	1. Teachers' Course	2	2	2
Allen	2. Aeschylus	2	5	3
	LATIN.			
Richardson	1. Ovid's Fasti	2	21	14
Richardson	2. Teachers' Training Course	2	35	11
	ENGLISH.			
Wells	1. Daily Themes	2	107	103

STATEMENT OF INSTRUCTION AND ATTENDANCE IN THE SUMMER SESSION, 1902—*(Continued)*.

INSTRUCTOR	TITLE OF COURSE	Credit Value, Units	No. of Students	
			Enrol'd	Took Exam.
Baldwin	2. Essays in Logical Compositions	2	26	13
Scott	3. Analysis of English Prose	2	44	28
Baldwin	4. Lectures on Literary Composition, with especial reference to Narrative	2	52	24
Wells	5. Method of Correcting Compositions	2	25	25
Scott	6. Method of Teaching Rhetoric and English Composition	2	71	33
	GERMAN.			
Demeter	1. The Elements of German	2	53	27
Schilling	2. The Teaching of German	2	27	2
Schilling	3. German Literature from Klopstock to Goethe's Death	2	26	7
	FRENCH.			
Lamare	1. Introductory French	2	62	19
Lamare	2. Advanced French	2	23	10
	SPANISH.			
Howard	1. Introductory Spanish	2	59	36
Howard	2. Advanced Spanish	2	11	10
	ITALIAN.			
Spinello	1. Elementary Italian	2	4	2
Spinello	2. Advanced Italian	2	5	3
	ART.			
Greene	1. The History of Art	4	37	20
Greene	2. Illustrated Lectures	....	....	....
	LIBRARY SCIENCE.			
Williams	(*a*) The Selection of Books	....	23	16
Layman	(*b*) Book-binding	....	....	....
Babcock	(*c*) The Use of Government Documents	....	....	....

STATEMENT OF INSTRUCTION AND ATTENDANCE IN THE SUMMER SESSION, 1902—*(Continued)*.

INSTRUCTOR	TITLE OF COURSE	Credit Value, Units	No. of Students	
			Enrol'd	Took Exam.
Greene	(*d*) Library Legislation in California	....	....	....
Rowell	(*e*) National Bibliography and Subject Bibliography	....	....	....
	MATHEMATICS.			
Lehmer	1. Analytic Geometry	2	31	26
Wilczynski	1B. Differential and Integral Calculus	2	26	14
Wilczynski	2. Theory of Functions of a Complex Variable	2	10	4
Stamper	3. The Teaching of Elementary Mathematics	2	59	31
	PHYSICS.			
Van Gorder	1. Laboratory Exercises in Matriculation Physics	lab only	72	matric 26
Van Gorder	2. Elementary Physics	lab only	47	....
Lewis	3. Physical Measurement	4	16	12
Merritt	4. Recent Advances in Experimental Physics	1	23	11
Merritt	5. Electric Waves and Oscillations	1	26	11
Lewis	6. Light	....	5	inc.
Lewis	7. Advanced Laboratory	2 and 4	3	2
	CHEMISTRY.			
Lachman	1. Elementary Chemistry	matric	39	30
Biddle	2. Qualitative Analysis	2	20	16
Biddle	3. Quantitative Analysis	3	22	15
Lachman	4. Organic Chemistry	3 and 4	11	5
Lachman	5. The Theory of Solutions	....	....	....
	BOTANY.			
Harper	1. Plant Life	2	80	68
Harper	2. Cytological Seminary	1	6	16
	MINERALOGY.			
Eakle	1. Determinative Mineralogy	1	22	12
Eakle	2. Descriptive Mineralogy	2	18	9

STATEMENT OF INSTRUCTION AND ATTENDANCE IN THE SUMMER SESSION, 1902 *(Continued)*.

INSTRUCTOR	TITLE OF COURSE	Credit Value, Units	No. of Students	
			Enrol'd	Took. Exam
	AGRICULTURE.			
Henry	1. Animal Nutrition and the Rational Feeding of Live Stock on the Farm	1	11	8
Wickson	2. California Horticulture	2	20	16
Woodworth	3. Teachers' Course	2	35	23
Woodworth	4. Entomography	2	6	4
Woodworth	5. Orchard Inspection	2	7	6
	FORESTRY.			
Fernow	1. Public Lectures	....	....	....
Fernow	2. The Art of Forestry	....	....	....
	IRRIGATION.			
Wilson, Thomas, Chandler	1. Irrigation Institutions and Laws	....	....	....
Wickson	2. Irrigation Methods in Farm, Orchard, and Garden, with Effect on Quantity and Quality of Product	⅔	11	4
	PHYSICAL CULTURE.			
Magee	1. Course for Men	....	....	....
Magee and Mrs. Magee	2. Course for Women	....	....	....

The total number of students enrolled in the summer school was 830, as against 799 in the previous summer; the total number of officers of instruction was 50—four more than in the summer of 1901.

In response to a clearly expressed demand, an effort was made this year to build up and develop certain phases of "student life" in connection with the Summer Session. The lines of activity were somewhat as follows: Information was circulated concerning the chief libraries in the

cities about the Bay, as well as concerning the Board of Trade, Mining Bureau, Alaskan Museum of Ethnology and Natural History, Academy of Sciences, Mission Dolores, Presidio, United States Mint, and other institutions of educational or historical importance, in order that students might have easy and ready access to them. Supplementary to the Art courses: (1) Mr. Irving M. Scott generously opened his art galleries to students on two Saturdays. These occasions were well managed by the Art Association of the University. (2) Mr. Edward Deakin, the painter of California missions, received students in his studio one day each week. (3) And a similar privilege was extended by the Mark Hopkins Institute of Art. (4) Messrs. Paul Elder and Morgan Shepard arranged for the students an exhibition of rare books and *objets d'art*.

Extra lectures, some open to the public, some to the general body of students, were given by several members of the faculty. Special thanks in this connection are due Professor Royce, Professor Scott, and Dr. Soldan. A feature of the Summer Session much appreciated was the so-called "Walks and Talks"—a series of walks in the Experimental Gardens and other parts of the Campus with informal talks on plants and trees by Professor E. J. Wickson and Mr. J. B. Davy.

The Y. M. C. A. and the Y. W. C. A. added much by their work to the efficiency of the Summer Session. Their aid is all the more appreciated because this season the associations were short of funds and short of assistants.

Good facilities in athletic training and recreation were offered, both of the in-door and out-door sort. In the latter class were such sports as tennis, hand ball, basket ball, boating, and field trips. The last were especially appreciated. Excursions under the guidance of Professor and Mrs. Magee were made to: (1) Grizzly and Bald Peaks, (2) Redwood Cañon, (3) Mt. Tamalpais and Bolinas, and (4) Mt. Diablo. It seems desirable that such outings should be made a feature of summer sessions in the future,

but that, unlike the case this year, those who participate in them should bear the traveling expenses of the leaders.

Prominent features of the summer session were the University Meetings, held June 30, July 11, July 18, and July 25. The speakers at the first were President Benjamin Ide Wheeler and Professor Josiah Royce; at the second, Professor C. C. Plehn and Professor H. M. Stephens; at the third, Professor B. E. Fernow and Professor F. N. Scott; at the fourth, Professor W. A. Henry and Professor Irving Stringham. These meetings give a unity and solidarity to the Summer Session which can hardly be brought about in any other way.

Men teaching science in the University received a courteous invitation from Mr. J. B. Milton, Commander U. S. N., to go as his guests by the steamer Madroño to the Farallones for purposes of scientific observation. Professor R. A. Harper, Professor W. J. V. Osterhout, and Dr. F. W. Bancroft were able to avail themselves of this valuable opportunity. Through the generosity of certain United States Army officers, notably General Hughes and Col. W. H. Baldwin, the majority of the members of the faculty, together with their families, were able to make a cruise on the Bay in the steamer Slocum. The party went ashore and was hospitably received at Alcatraz Island and Yerba Buena. At the latter place a visit was made to the United States Naval School of the Pacific. The University Club of San Francisco gave a dinner, August 1, in honor of the visiting members of the Summer Session Faculty. The occasion was of special interest in view of the fact that the club proposes to give such a dinner annually, coördinately with "University of California Night" and "Stanford University Night." Speeches were made by Mr. Fairfax Wheelan, President of the Club, Professor Royce, Professor Scott, Professor Henry, Professor C. S. Baldwin, and Professor Stephens. The Berkeley Club gave a dinner, August 1, in honor of its former member, Professor Royce.

THE D. O. MILLS EXPEDITION TO THE SOUTHERN HEMISPHERE.

By W. W. CAMPBELL.

The starlike bodies which we see in the sky were classified by the ancients as planets and fixed stars. The term fixed star was unfortunate; it is a misnomer, and within the present generation of astronomers it has been completely discarded. The countless suns of space are now called simply "the stars." There are no stars whose positions are fixed, even though to the naked eye they appear to occupy the same points for hundreds, and in most cases, thousands of years. Observations made with the Mills Spectrograph of the Lick Observatory in the past six years have established the fact that the stars are in reality moving more rapidly than our planets.

Motion appears to be a universal property of matter. It is, in fact, the first law of self-preservation, and a cessation of motion would lead to catastrophe. If the satellites in their revolutions about our planets, and the planets in their revolutions about our sun, were to pause, the solar system would quickly be destroyed.

Our knowledge of the motions of the planets, satellites, and comets of the solar system has been fairly complete for many years, if we except the minute unexplained discrepancies which exist in the cases of Mercury and the Moon. As to the motion of the distant stars we know but little, though it must be said that no other problem in the

science has received so much attention. The magnitude and extreme difficulty of this problem may be faintly appreciated through the statement that observations contributing to its solution began in the middle of the eighteenth century, when astronomical instruments reached some degree of perfection, and have continued to absorb a very large share of astronomical resources ever since. The difficulties of the subject are due to the stupendous distances of the stars from the observer, to the relative minuteness of his base-line, and to his inability to observe their motions directly. Their apparent motions are not their real motions at all. Every observed motion is a combination of the star's real motion and of the observer's motion. The latter is made up of components due to the rotation of the earth on its axis, to its revolution about the center of mass of itself and the Moon, to its annual revolution around the Sun, and to the motion of the solar system as a whole. The elements of the first three components have long been known, but our knowledge of the solar motion is still very incomplete. And before the effect of the observer's motion can be eliminated, it is further necessary that the distance between the star and the observer be known. We do not know even the approximate distances of more than thirty stars in the whole sky.

Observations of a star's position made with a meridian circle, and repeated at long intervals of time, enable us to determine that angular component of its apparent motion—called its proper motion—which is at right angles to the observer's line of sight. But this is affected both by its distance and by the solar motion.

Observations with the spectrograph enable us to measure a star's apparent component of motion in the line of sight, in case it is fairly bright and its spectrum contains lines suitable for measurement; but this component is likewise affected by the solar motion.

A better knowledge of the distances of the stars, and a better knowledge of the elements of the motion of the solar

system, are now the most pressing needs in astronomy. The latter problem is being vigorously attacked by astronomers in several countries, and it is a matter of but a few years when satisfactory results will have been reached. Present methods of solving the former problem are not sufficient, but the subject is now receiving most careful consideration from many investigators. Stellar distances are so great that our instruments seem capable of measuring only a few of the smaller ones.

It is evident that if the solar system is moving toward a given point, which we shall call the apex, the proper motions of the stars will in general appear to be away from the apex, and toward the opposite point of the heavens. I say in general, for the reason that motions in all directions will continue to be observed; some toward the apex, others away from it, some at right angles, and others in various directions; but the prevailing tendency will be away from the apex.

By studying the proper motions of the very few stars previously determined, Sir William Herschel, more than a century ago, was led to the shrewd guess that the solar system is moving in a straight line toward a point within the constellation Hercules. As the number and accuracy of observations made with the meridian circle increased, from decade to decade, other solutions were attempted. One astronomer, Stumpe, recently combined the observed proper motions of three thousand stars for this purpose. The results obtained by Boss, Stumpe, Kapteyn, Newcomb, and others, confirm in a general way the correctness of Herschel's opinion. Nevertheless, their individual results vary to such an extent that an uncertainty of at least ten or fifteen degrees exists in the assigned positions of the apex.

Herschel was essentially ignorant of the distances of the stars. As this factor is a most vital one in determining the speed of the solar system from observed proper motions, he assigned very little weight to his conclusion that it is approximately ten miles per second. Want of knowledge

of the distances of the stars, even at the present time, has made the estimates assigned by our investigators partake more or less of the nature of guesses, and their values range all the way from five to thirty miles per second.

There was little promise of attaining better results except through the discovery of methods quite independent of stellar distances. Fortunately, the invention of the spectroscope, and the prompt recognition of its ability to measure velocities of recession and approach, supplied the means for improving our knowledge of the solar motion.

Although the stars are moving in all directions, being apparently independent of one another, with few exceptions, yet if the solar system is moving toward a given point in the sky with a speed x, the stars in that region will appear on the average to be moving toward the solar system with a speed x; and the stars in the opposite portion of the sky will appear to be moving away from the solar system with a speed x. Conversely, if the speeds of the stars distributed over the entire sky be measured with the spectrograph, there should be no difficulty in determining by mathematical solution that point toward which the solar system must be moving in order to explain the excess of approach velocities in the one hemisphere, and the excess of recession velocities in the other.

The writer undertook to obtain the observations necessary for the solution of this problem, in the year 1895, by means of the powerful spectrograph (photographic spectroscope) presented to the Lick Observatory by Mr. D. O. Mills. With this instrument attached to the great telescope, assisted during the past five years by Assistant Astronomer W. H. Wright, and during the past two years by Dr. H. M. Reese, we have measured the line-of-sight velocities of about four hundred of the brighter stars with great accuracy. The results for these stars were recently combined in order to effect a preliminary solution of the solar motion. It was found that the solar system is moving approximately toward the southern part of the constellation of the Lyre,

with a speed of twelve and one-half miles per second. The result for speed is no doubt very near the truth, but there is little question that the assigned direction of motion is capable of considerable improvement. Its weakness arises from the fact that the observations are not distributed over the entire sky. The stars between 30° South Declination and the South Pole of the sky are without representation in the solution.

Shortly after taking up this line of work, there appeared to me the strong desirability of organizing an expedition to the Southern Hemisphere for the purpose of observing the bright stars in the region of the sky not accessible from Mt. Hamilton. A favorable opportunity to plan for such an expedition presented itself late in the year 1900. The problem to be solved, and the needs of such an expedition were explained in detail to Mr. D. O. Mills, whose earlier generosity had so greatly assisted us. His response to the appeal was prompt. He provided funds to construct the apparatus required, to pay the salaries of the observers, and to defray the expenses of travel.

The instruments, previously designed in general by the writer, were rapidly planned in detail; and it was hoped that they might be constructed in time for the Expedition to sail late in the year 1901. Unfortunate delays, arising from the machinists strike and from difficulties in constructing the optical parts of the telescope, have postponed the departure for a full year. But, unlike the case of a solar eclipse, the observations need not be made at any given time, and no harm has come from the delay. It is hoped that the expedition may sail from San Francisco in the course of another month.

The telescope constructed for the use of the expedition is a reflector of the Cassegrain form. It will be the largest reflector in systematic use at the present time. The parabolic mirror of silver-on-glass, to be mounted in the extreme lower end of the tube, is 37¼ inches in diameter, and about 6 inches thick. Its accurately polished surface is 36¾

inches in diameter. There is a 5-inch circular aperture in its center. Rays of light from a star, falling upon this mirror, would be brought to a focus 17½ feet above it; but a hyperbolic convex mirror, 9¾ inches in diameter, is to be placed 4½ feet inside the focus just within the upper end of the tube, to receive the converging beam of rays from the large mirror and reflect it back through the hole in the center. The rays will be brought to a focus 18 inches below the surface of the large mirror, exactly on the slit of a powerful spectrograph.

The telescope is mounted equatorially in the usual manner, though with several new features of purely technical interest. The spectograph rigidly attached to the lower end of the tube resembles the Mills Spectrograph of the Lick Observatory in theory. In reality, however, it embodies many new departures in design, suggested by our experience of the past few years. The telescope will be covered by a steel dome thirty feet in diameter. The equipment is intended to be first-class in every respect, and it is confidently hoped that it will prove to be very efficient.

The dome and instruments will be mounted on one of the low hills near Santiago, Chile, where they will remain for two or three years.

It is planned to measure the velocities of three or four hundred stars in the one-quarter of the sky lying between 30° South Declination and the South Pole. The photograps will be sent to Mt. Hamilton for measurement and discussion. It is expected that the combination of the spectroscopic results obtained at Mt. Hamilton and at Santiago will lead to a very satisfactory solution of the perplexing problem of the motion of the solar system through space.

There is little doubt that in Chile, as at Mt. Hamilton, the discoveries of spectroscopic binaries, etc., as by-products of the investigation, will rival in interest the results which comprise the main purpose of the work.

After the instruments are installed at the observing

station, the expedition will be in charge of Acting Astronomer W. H. Wright. He will be assisted by Mr. H. K. Palmer.

The Government of Chile has offered to admit the instruments free of duty, and has expressed its anxiety to further the purposes of the expedition in every possible manner. It is hoped that the results of the observations will be a credit to the University of California and to the generous donor, as well as to the great problem whose solution we are attempting.

MARINE BIOLOGY AND THE MARINE LABORATORY AT SAN PEDRO.

By William Emerson Ritter.

A marine biological laboratory has been maintained at San Pedro by the Department of Zoölogy of the University during the last two summers. What this laboratory has been doing does not matter much. It has not accomplished momentous things, and the University community would not be much interested in the details of the tentative work that has been going on. What, in broad terms, it wants to do, what it intends to do, if it does anything further, is the point. This would amount to something and the University community ought to be interested in it.

Why are biologists so fond of marine laboratories? Why do they so much like to study things that live in the sea?

Perhaps laymen do not realize that biologists have any special preference for such studies. But glance over the roster of the names of those illustrious in the biological domain and note who have won their distinction wholly or in part by researches in marine life: Darwin, Huxley, both Agassizs, Haeckel, Kovalevski, Balfour, Loeb, Mechnekoff, Weismann, Brooks, Milne-Edwards, Hertwig, Dohrn, Wilson, Driesch, Lankester, and many more were it worth while to extend the list. For most of these it was no mere matter of circumstance, such as might be expected in the course of any active scientific career, that attention should

sooner or later be directed to this realm. In the main these men have appealed to sea creatures for light that could not be got elsewhere on large problems of biology. Glance now at some of the focal points in the science itself—at the points around which, as in all sciences, the efforts of its foremost cultivators always chiefly center.

It is hardly going too far to say that almost all the exact knowledge we possess of the mechanism of heredity, of the structure of reproductive cells and of the wonderful processes gone through by them during the initial stages of development, has come in the first instance from sea animals—from the humble sea urchin more than from any other.

The new and very important department of developmental science known as "Developmental Mechanics" (interpreted by one of its foremost exponents as "the doctrine of the causes of the origin and maintenance of organic forms") has been built up almost wholly, but for the one notable exception of the all-pervading frog, around animals that live in the sea.

Strangely enough it seems at first, our deepest insight into the fundamental difference between plants and animals, and likewise into the fundamental dependence of the latter upon the former, is coming from the infinite millions of minute one or few celled beings (you may call them plants or animals as may suit your whim, and not be wrong) that float on the surface of the sea.

Jelly fishes and polyps have taught us more than all other animals combined about how the nervous system got a start. And from other sea animals, particularly worms, molluscs, and fishes, has come most of what we know about the beginnings of eyes and ears. Barnacles and sea squirts have given us our most impressive lessons in down-hill evolution. Creatures that dwell in the abysmal depths of the ocean have instructed us as no other organisms have on the ability of animals to flourish happily in regions where, *a priori*, it was believed they could not exist at all.

In other words, from these we have gained our most important lessons on the range of conditions to which living things are able to accommodate themselves.

And why are sea creatures thus preëminently important for philosophical biology? There are several reasons. One is precisely the reason why savages with their tribes and clans are so important for the philosophical study of human beings and human society. The most primitive of all animals dwell in the sea. The incipient stages of family and colonial aggregation among animals are nearly all found among sea creatures. Another reason is that by far the greatest diversity of animal forms, so far as fundamental types are concerned, is found in the sea. Of course this is of prime importance for the investigation of great problems of biology. The more doorways there are to a problem, the more chances there are of getting into it. Another reason is the greater simplicity of organization of sea creatures, and especially of their ways of development. Embryological processes are difficult enough to follow and to understand at their simplest. In their maximum of complexity they well-nigh defy the efforts of the student; so it is of the greatest moment to get them first in their least involved and least complex states. A final reason to be noted is the greater ease with which marine animals, and particularly their eggs and embryos, can be got at for study, and hence the readiness and ease with which they lend themselves to experimental investigation.

Now if the questions be asked, why the greater primitiveness of sea creatures? why their greater diversity of fundamental types? why their greater simplicity? the answer is ready at hand, and is twofold. First, they are as a whole vastly older racially—phylogenetically in the stilted terms of the biological cult—than the animals of the land and the air. It is now known positively that not only was the sea the original home of all animal life, but that this life remained in its original home for countless ages before it began its migrations to the land. Second, the condi-

tions of life in the sea have ever been and still are much more constant, and in general easier, than upon the land; consequently evolution has been much slower in the sea; much less change has been wrought there than on the land upon the fundamental types of organization. There has been less covering up and obscuration through modification of foundation plans. Exegesis of the evolutionary record of sea creatures is accordingly much easier than that of land creatures. This is enough, perhaps, to establish the point that facilities for prosecuting researches at the seaside are of supreme importance for biological science.

This being so, the question, Ought California biologists to have such laboratories? would not be in order. To be given great opportunities by nature and to make no effort to use them is always an unpardonable offense against the powers of light and progress. The only questions are: What sort of laboratory should we have? What should be its special aims?

Researches in the life of the sea have been prosecuted widely and with great energy in recent years. We have learned much, very much, from them. Perhaps the most important thing we have learned, however, is what to do next. Now it is exactly the thing that should be done next that we here in California are, by the grace of a beneficent Providence, specially commissioned to do. Detailed, comprehensive, continuous and long-continued *observation* and *experiment*—these are the two golden keys that will let us farthest into the mighty *arcana* of the life of the sea.

Who that is accustomed to the sea can fail to recognize that an ocean like that off Southern California, where icy tempests never rage, and where torrid heat never enervates, must be exactly the sort of an ocean where observations and experiments of the kind specified could best be carried on.

First of all, future marine biological research must rest on thorough knowledge of the sea itself. This is the *milieu* of marine animals; and the veriest tyro in evolution well knows that an animal without an envir-

onment is as little to be conceived as are oranges without orange trees. The depth of the water; the currents flowing through it—their direction, their strength, and their variableness; the material and conformation of the ocean floor—all these must be studied. The chemistry of the water, its organic and inorganic constituents, solid and gaseous, must be accurately known, as also the temperature of the water—and the variations of all these for different localities, and in the same localities for different depths, different seasons of the year, and different times of the day. The depth of penetration of sunlight into the water, and the effect of it and its absence, direct and indirect, on organisms must be investigated.

So the future marine station, particularly the California station—must be planned for chemical, physical, and hydrographic as well as for strictly biological research. It must have boats fitted with a great variety of apparatus. For the all-important experimental researches it must have aquaria that will reproduce in miniature and in a form easy to control the conditions of nature as far as possible. And over all, of course, there must be men. The work must go on every hour of the day, and every day of the year.

It would be wholly useless to attempt to particularize here the biological problems that should at once engage the efforts at our station. One group of problems is, however, of such peculiar importance and appropriateness for us that I allude to it. It is that of the relation of organisms that inhabit the shallow waters along shore, and the surface layers of the open sea—organisms, consequently, subject to the direct influence of the atmosphere and solar heat and light,—to the animals that dwell in the profound depths, wholly shut off from the influences above mentioned. Why have these animals left their ancient surroundings, so normal and benign to their natures, and sought regions so abnormal, so seemingly hostile, that we should have pronounced—and indeed science actually did pronounce—them *a priori* incapable of supporting animal

life? The great pressure, the absolute and eternal darkness, the supposed absence of available oxygen, and of food supply, seemed sufficient grounds until the facts actually proved the contrary for denying that life of any sort could exist in the abysmal depths.

What exactly have been the steps in these migrations, what their causes? Shall we accept as a sufficient explanation the idea of pressure from the "struggle for existence?" No, this is too general, too vague to satisfy. Physical and chemical actions and physiological reactions of a wonderful nature have been going on here. Upon these processes the struggle for existence hypothesis throws no light.

Two circumstances make an attack upon this particular group of problems here on the California coast especially promising of results. They are, first, the uniquely favoring climatic conditions, above referred to, that will render possible the essential *continuous observation* and *experiment*. The second is the fact that our coast at so many points drops off abruptly to the profound oceanic depths. Six miles off San Pedro, for example, we plunge down to a depth of 500 fathoms; and 45 miles off, to a depth of 2,000 fathoms. At most places on our Atlantic coast 50 miles are required to reach the first depth and 100 miles to reach the second, while nowhere about the British islands can 500 fathoms be reached short of from 100 to 200 miles from shore. The whole North Sea and English channel are comparatively shallow, nowhere more than 200 fathoms in depth.

What the Lick Observatory is doing in astronomy, and what, too, the College of Mines is doing in its domain, are not wholly due to the men, excellent as these undoubtedly are, to whose hands the conduct and work of these departments are entrusted. With both, the unique advantages of position are being made to count.

The endowment in money by James Lick and the Regents and friends of the University, coupled with the endowment by nature of a matchless atmosphere and climate, are

together the factors that are enabling the Observatory to achieve splendid results for science and win renown for the University. California's natural advantages for Biology, particulary for marine Biology, are, I fully believe, even more exceptional than those for Astronomy.

These advantages we must turn to account. The San Pedro Station has no ambition merely to do again what has been and is being well done elsewhere. It would be unworthy of our State and unworthy of our University for the station to rest its ambitions at anything less than the doing of that which by nature it is peculiarly fitted to do. There are diversities of gifts; to one prophecy; to another divers tongues; to another interpretation of tongues; but the same spirit. Each according to the measure and kind of its own endowment to the one great end, the increase of man's knowledge of himself and the world, that is the watchword with marine biological stations as with men.

What has been done at the station during the past two years has been ordered as far as possible with the little funds available, as though it were the beginning of what ought to be done.

In the collecting carried on a year ago every spot at which the dredge or trawl was cast was accurately located on our charts. All the specimens captured were either preserved, and are now in the University collections, or were recorded, so that we have the data for full and accurate information as to what creatures were at hand at these particular stations at this particular time. We also learned as much as we could, with our rather crude instruments, about the condition of the water at each station.

We shall now be able to return at any future time, when we have the means for doing so, to these identical spots for the purpose of seeing what the conditions may then be there, and how much change may have taken place in the animal population.

Then, of course, we have not neglected to carry on various investigations of the sorts usually prosecuted at such

laboratories. Diverse creatures new to science have been discovered and described. Additional information about imperfectly known animals has been obtained. Systematic observations on the habits of different animals have been made. Experimental studies in regeneration of animals have been carried on. Experimental studies also, on the action of the heart of certain humble creatures have been prosecuted. Various points in the embryology of several animals have been investigated; and so on. Furthermore, formal instruction has been given to a number of beginners in biology. And a number of teachers in colleges and high schools have increased their knowledge, experience, and enthusiasm at the laboratory.

And now as to the future. Have our ambitions as herein outlined reckoned in any way with the prosaic question of their possible realization? To carry on the investigations we have outlined will require $25,000 for building and equipping the laboratory and experimental aquaria; $10,000 for a 50-ton gasoline launch and its equipment; $5,000 a year for running the laboratory and small vessel. This does not contemplate any exploration of the profound depths of the ocean. For this an outfit not here contemplated would have to be sought. The University cannot, I suppose, be counted on to contribute anything to the undertaking from its own resources. Pity it is that the admission must be made. But it is so. This is the unfortunate position in which the University finds itself: While fully recognizing that the only way it can become a university in the highest sense and can obtain a place in the foremost rank of universities, is through research, it has nothing to devote primarily to this end. It must therefore for the present accept the humble role of being little else than a good dispenser of knowledge. So the funds must come, if they come at all, from outside sources.

Interested friends at Los Angeles, foremost among whom are Mr. H. W. O'Melveny, of the class of 1879,

Mr. J. A. Graves, Mr. Jacob Baruch, and Mr. A. C. Balch, are making heroic efforts to secure in that community the money necessary for the laboratory and its equipment. For the rest, like Elijah of old, we "stand before the Lord," hungry but full of trust, and therefore expecting the ravens laden with bread and meat to appear at any moment.

THE CLIMATE OF BERKELEY.

By Armin O. Leuschner.

A little more than fifteen years ago regular meteorological observations were begun at the Students' Observatory at Berkeley under Professor Frank Soulé. The Observatory is equipped with a set of standard barometers and thermometers and a rain-gauge, and daily observations of the weather are made in accordance with the instructions of the U. S. Weather Bureau for voluntary observers. Mr. Maddrill of the Students' Observatory has, under my direction, compiled the following synopsis of the observations from 1887 July 1, to 1902 June 30. A ten-year synopsis embodying the results of the observations from 1887 July 1 to 1897 June 30 was published in 1898.

Temperature.—Experience has shown that the average temperature of a day corresponds closely to the average of the temperature observed at 8:00 A.M., and 8:00 P.M., and this average is called the mean daily temperature. The maximum and minimum temperatures are observed daily by means of a maximum and a minimum thermometer.

The highest temperature during the fifteen years was 101°.0, on June 29, 1891; the lowest was 24°.9, on January 14, 1888. The mean highest temperature per year—*i.e.*, the average of the highest temperatures observed in each of the fifteen years—is 91°.3, while the mean lowest temperature is 32°.1. In an average year, therefore, we may expect 91° in the shade on the hottest day, and 32° on the coldest day, or a range during the year of 59°.

In order to give a clear idea of the weather conditions at different times of the year, fifteen-year averages have been drawn for each month, and are given in the following table. The average of the mean daily temperatures of a month we may call the mean monthly temperature, or the mean daily temperature for the month. The fifteen-year averages for each month of the year of these mean daily temperatures are given in the first horizontal line of the temperature table—*e.g.*, the mean temperature for July is 59°.2.

The general mean temperature is 54°.2.

The fifteen-year means of the highest and lowest temperature during the whole month are given in the second and third lines. Thus, for July, the mean monthly maximum and minimum temperatures are 83°.5 and 49°.7. The fourth and fifth lines contain the mean daily maximum and mean daily minimum temperatures during the fifteen years for each month. For example, for July, the mean daily maximum and minimum temperatures are 70°.3 and 53°.6; and the difference,—16°.7,—indicates the average variation of temperature to be expected during a day in July. The sixth and seventh lines give the fifteen-year means of the greatest and least daily variation for each month.

Atmospheric Pressure.—The highest barometer reading during the fifteen years was 30.637 inches, 1898 December 24, at 8:00 A.M., the lowest, 29.196 inches, 1891 February 22, at 9:00 P.M.* The means given in the pressure table were derived in the same way as those of the temperature table. Thus the mean daily atmospheric pressure for July is 29.950 (sea level).

The general mean atmospheric pressure is 30.021.

Relative Humidity of the Air.—If the humidity of the air at saturation is taken as 100 per cent., the average humidity for the fifteen years is found to be 84.0 per cent. The first horizontal line of the table gives the average for a normal day of each month, etc. The humidity frequently reaches the maximum, 100 per cent., and rarely

* Formerly observations were made at 7:00 A.M., 2:00 and 9:00 P.M.

falls below 30 per cent. The lowest point is reached during the prevalence of dry north winds or "northers."

Rainfall.—The average annual rainfall is 26.77 inches. The greatest annual rainfall, 47.37 inches, occurred in 1889–90, the least, 14.41 inches, in 1897–98. The distribution of the rainfall during the year is easily seen from the table. The maximum rainfall observed in twenty-four consecutive hours was 4.16 inches, 1891 February 14–15. Snow rarely falls.

Weather in General.—Under this heading the days of the month are divided into three groups, "clear," "fair," and "cloudy." The fifteen-year means are given in the table. In addition, the number of days on which fog or rain was observed is separately stated.

Wind.—The prevailing direction of the wind every month is given in the table. The W. and S. W. winds are usually cool and damp, and rarely exceed fifteen miles per hour; the S. winds are generally warm and rainy, the N. E. winds, or "northers," hot and dry, with an estimated velocity of from thirty-five to forty miles per hour. Fierce and cold winds generally come from the N. W.

An inspection of the table shows that the mean temperature varies but little during the year. The maximum daily variation of temperature is comparatively small during the winter months (about 19°), indicating a uniform winter climate. It should be stated that the meteorological Observatory is too protected for an accurate determination of the maximum and minimum temperatures. The daily variation for the average location in the town of Berkeley would be somewhat greater than the figures in the table indicate. The difference will be determined as soon as the Observatory can secure another set of instruments, which will be set up in a more exposed locality. Two-thirds of the days in a month are usually clear or fair, the other third cloudy. July and August have the greatest number of foggy days. Rain rarely falls during the months of June, July, August, and September.

METEOROLOGICAL OBSERVATIONS—FIFTEEN-YEAR MEANS FROM 1887 JULY 1 TO 1902 JUNE 30.

TEMPERATURE (Degrees F.).

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
Mean	59.2	59.2	59.5	57.4	53.4	47.9	46.3	48.9	50.0	52.7	55.9	59.3
Mean monthly maximum	83.5	82.3	83.6	83.9	72.9	62.5	61.3	67.5	70.7	75.5	81.4	84.0
Mean monthly minimum	49.7	51.1	49.6	46.2	41.2	35.3	34.1	35.9	37.7	40.3	44.0	47.4
Mean daily maximum	70.3	69.8	69.9	67.4	61.8	54.8	53.2	57.4	58.9	62.7	65.8	71.1
Mean daily minimum	53.6	54.1	54.5	52.7	48.7	43.4	42.1	44.3	45.3	46.9	49.7	52.7
Mean greatest daily var'n	28.6	26.7	27.4	27.9	21.9	18.6	18.0	20.4	22.1	26.7	28.5	30.2
Mean least daily variation	8.4	7.7	6.2	5.3	4.7	5.3	4.7	4.7	5.7	6.7	7.0	8.7

ATMOSPHERIC PRESSURE (Inches).

Mean	29.950	29.447	29.951	30.005	30.081	30.134	30.098	30.093	30.047	30.036	29.955	29.951
Mean monthly maximum	30.124	30.097	30.119	20.215	30.309	30.418	30.359	30.374	30.353	20.292	30.201	30.141
Mean monthly minimum	29.787	29.796	29.737	29.722	29.760	29.699	29.655	29.672	29.659	29.767	29.699	29.751
Mean monthly range	0.337	0.301	0.382	0.493	0.549	0.719	0.704	0.702	0.694	0.525	0.502	0.390

RELATIVE HUMIDITY (Per Cent.).

Mean	83.1	85.1	84.2	82.5	81.9	84.5	85.0	85.0	85.4	84.8	84.3	82.0
Mean maximum	95.3	95.7	96.1	95.9	96.1	97.0	96.8	96.9	96.5	95.4	95.7	95.1
Mean minimum	56.3	64.2	55.6	42.7	50.2	56.5	58.5	58.5	58.7	61.9	61.9	62.4
Mean monthly range	39.0	31.5	40.5	53.2	45.9	40.5	38.3	38.4	37.8	33.5	33.8	32.7

RAINFALL (Inches).

	0.03	0.06	0.58	1.74	2.83	4.62	5.34	3.94	4.33	1.86	1.32	0.18

WEATHER IN GENERAL (Days).

Clear	14	12	14	16	16	13	12	12	12	14	12	16
Fair	7	8	7	7	5	8	7	6	7	6	7	7
Cloudy	10	11	9	8	9	10	12	10	12	10	12	7
Foggy	13	12	7	5	4	2	2	3	3	2	3	6
Days on which rain fell	1	0	3	5	7	11	11	9	11	6	5	2

PREVAILING DIRECTION OF WIND.

	SW	SW	WSW	SSW&N	N&SSE	SE&NNE	NE&SE	N&SE	SE&NNW	SSW&W	SW	SW

ARTHUR RODGERS.

By CHARLES WILLIAM SLACK.

Arthur Rodgers was born August 6, 1848, near Nashville, Tennessee. His ancestors, upon the close of the War of the Revolution, removed from Virginia to the State of his birth. His parents, who had become impoverished by the ravages of the Civil War, removed with their family, in 1864, to California. Here he received his final education, first at the Normal School and next at the University. After graduating from the Normal School, he taught in the public schools for a time, until he had acquired sufficient means to defray his expenses at the University. He entered the University in 1870, and graduated two years later. Upon the completion of his University course he studied law, and in due time was admitted to practice. He was a successful practitioner almost from the beginning of his professional career, winning several cases that brought him reputation and fortune, notably a case against the city and county of San Francisco for damages for destruction of property through the "Sand-lot" riots. Owing to failing health, he gave up his practice for a time and spent two years in travel, and in the study of the institutions and customs of a number of countries, notably Japan, China, Siam, India, Egypt, Palestine, and Spain. He returned to San Francisco, his health restored, and resumed the practice of the law, in which he was actively engaged until his health again gave way. Two of his most notable cases

during the latter part of his life were the Walkerly Trust Case and the Martin Will Case, in each of which he achieved a notable victory. He was appointed a Regent of the University in 1883 for a short term, and in 1889 was reappointed for a full term of sixteen years. In 1895 he married Mrs. Elizabeth A. Montgomery. He died June 24, 1902. His wife and a little daughter survive him.

I became acquainted with Mr. Rodgers in 1883. He had just returned from a trip around the world and had commenced again the practice of his profession in San Francisco. His naturally dark hair and beard were already quite gray and this gave him a matured appearance beyond his years. He was tall and spare, energetic in movement and quick in speech. He had graduated from the University in 1872, had practiced law for a few years, and had already achieved a remarkable success. Too close an application to his work had somewhat affected his never robust health, and he had been obliged to seek rest and recreation in travel abroad. He had returned to the scene of his former labors and triumphs in good spirits, ready to begin anew with all his characteristic enthusiasm. I became known to him as a graduate of his Alma Mater of a later time and as a student of his own profession. We continued to be friends and associates up to the time of his death.

Shortly after I first met him, I had the pleasure of congratulating him upon his appointment as a Regent. I knew of his devotion to the University, and I had learned to respect his lofty character and great wisdom. I felt certain that the University was also to be congratulated upon the fact that, for the second time in its history, one of its graduates had been chosen to direct its affairs. I am not quite certain that the older Regents, who did not know Mr. Rodgers, really welcomed him to a seat among them. It was not long, however, before they all recognized him as a wise counsellor, and he soon became and continued up to the time of his death to be a leader in the deliberations of the Board.

The causes which contributed in the largest degree to the success of Mr. Rodgers were his pleasing address, his frank manner, his earnest purpose, his excellent judgment of men and affairs, and his unswerving integrity. He had the respect and confidence of all who knew him. He took an active interest in politics, not for the purpose of personal gain or advancement, but because he believed it to be his duty. The only office he ever held or would accept was that of Regent of the University. This office was his pride. Always a busy man, he never was too busy to devote his energies to the interests of the University, educationally and financially. The welfare of the University was constantly uppermost in his thoughts. His last words to me were words of solicitude for its President, who had been chosen principally through his instrumentality. In his death the University has lost a sincere friend and the State a good citizen.

GENERAL W. H. L. BARNES.

By JOHN ELIOT BUDD.

General W. H. L. Barnes took his seat on the Board of Regents in 1889, and his wide and varied experience, fine educational qualifications, splendid eloquence, and sound judgment made him an unusually valuable Regent.

He was practically President pro tempore of the Board, and presided at the meetings with dignity and ability; and while he was a master of Parliamentary Law, he abhorred red tape, cared not a rap for moss-covered precedents, and his method of expediting business, although not strictly in accordance with Cushing's Manual, was effective. He reached the definite result quickly, even if he was required to cut across lots to do it.

While oratory is at a discount in the Board meetings, yet occasions would arise when General Barnes would deliver a characteristic address. He was an orator in the true sense of the term; simple, direct, clear, polished, sincere, convincing by his logic, persuading by his eloquence, causing admiration for his choice and forceful English. He was especially noted for the brilliancy of his wit and the pungency of his satire.

He was assiduous in attending the meetings of the important committees of the Board of which he was a member, where the real work of the Regents was performed; as Chairman of the Lick Observatory Committee, he rendered invaluable service to this Department of the University. This to him was a labor of love, as he was

intensely interested in Astronomy, and possessed a knowledge of this Science which enabled him to act in an intelligent manner.

He had a proper conception of the duties of the office of Regent, and while favoring legitimate supervisory control of the affairs of the University, more especially in finances, he recognized that the President was the executive head, and gave him his earnest support.

He favored securing the best talent and equipment, and advocated liberality in expenditures for such purpose within the income of the institution.

He believed in the expansion of the University, and was quick to respond to, and earnest in supporting, all sound proposals for its betterment.

It is difficult to detail the services of General Barnes as a Regent; suffice to say that he gave his time, his talents, and his services for the advancement of the University of California, with firm belief in its future greatness, and its value as a strong force in the upbuilding of the State.

In his death his associate members lose a most charming companion; the University, a faithful and capable trustee, a true and sincere friend. His memory should be perpetuated and honored at Berkeley.

IN MEMORIAM—FRANK NORRIS.

1870–1902.

It is hard to write of Frank Norris as of one whose work is done; the fact is hard to realise and harder to accept. It is proper, however, that in this journal should appear the tribute we give to the dead, for he was not only a distinguished but a very loyal and enthusiastic son of this University. His work in American letters is for more competent hands than mine to write of. To me he was always a very dear college friend and it is out of the intimacy of those years together that I can speak, with knowledge, of the man he was outside of his books.

Norris was twenty years old when he entered the freshman class of the University in 1890. He was born in Chicago and with the exception of two years abroad, he had lived for most of his life in San Francisco. His earliest bent was toward art. He spent a few years at the Mark Hopkins Institute, if I mistake not, and then went to Paris to study in Julian's *atelier*. He learned a great deal about French literature while in Paris, and was unconsciously influenced a good deal by the French view of life—especially the love of beauty and of the pleasant side of existence. He threw himself with zest into the study of mediaeval French armor, costume and architecture. There is a story of his in the *Overland Monthly*, somewhere in the files of '95 or '96, which shows the result of this boyish enthusiasm. But he never became an artist, possibly because he did not persevere long enough to reach proficiency. Quite

frequently he used to illustrate his own earlier stories; the *Blue and Gold* of the different years of his college life and later the *Overland Monthly* show some of his work. It was not very good; his figures were apt to be wooden and the whole effect rather amateurish. His purely decorative work was more successful, though often imitative. I speak of this period of his life simply to suggest the influence which this artist life may have had in the development of his genius.

When Norris entered college I doubt if he had any friends here at all—the years of art study had broken off the friendships of the preparatory school. I remember him as a tall thin man, very dark, with hair just beginning to show the gray that was afterward so characteristic, his fashion of wearing a small moustache and side-whiskers giving him a rather foreign appearance that only wore away with longer acquaintance. He was slow in making friends at this time, strangely enough, for he was one of the most attractive men I ever met. When in the latter part of the second term he was named as one of the Bourdon speakers, there was some criticism of the freshman president for putting in an unknown man. Norris never had an opportunity to justify his selection; the sophomore class abducted him three days before the celebration and kept him in Oakland till it was finished. Soon afterward he was asked to join the Phi Gamma Delta fraternity, and no man has ever shown so ready an appreciation of this offer of friendship from his fellows or given in return such wealth of comradeship.

Of Norris's work as a student there is little to be written, of his student life a great deal. Some college president has said that a good part of education is in rubbing against the walls of a great university. Frank Norris's university education was mostly of this kind. He hated study of the methodical sort and employed every means to avoid it. It may be a disappointment to classical scholars who have noted the effectiveness with which in *The Octopus* he uses the device so familiar in Homer

and Virgil of reiteration of descriptive phrases, to learn that he knew no Greek and had his friends help him with his Latin which he hated heartily. He always passed by a scratch. It is just to say that his preparation had been poor. He liked history and I believe did good work in English literature. Minto and the prose composition of the freshman course in English were an abomination to him. In French he must have taken every course that the University offered, partly because he liked the literature and the genial professor who taught it, but not a little because preparation of recitations was to him unnecessary. He took no philosophy or science, except the two courses of Professor Joseph LeConte and those only for love of the man. Mathematics was his *bête noire*. As every examination approached he employed a competent tutor with a view of clearing away his entrance mathematics, but failed time after time. He never attained regular standing and never graduated. I remember once finding him in his room working hard and in great distress of mind, in preparation for an examination in algebra. His rather heroic method was to learn by heart the various demonstrations of the text; he simply refused altogether to exert his mind to reason it out.

In everything that went to make up student life outside of class-rooms, he found a keen delight. To him who was always seeking for real life, this and not study was the real life *par excellence* of the college period, which he would not live again; and so he lived it with all his might. He was always ready for any college prank or celebration and never missed a rush or a football game. Indeed he was an enthusiastic spectator of a game on the campus only a week before his death. His greatest joy in college, however, was in the club life of his faaternity. He was an ideal club man; he had the social gift beyond any man I have known. And all the time he was storing up material for his later work. The character of Annixter in *The Octopus* in the early part of its development is one of his club friends to

the life, and many of the incidents in his books actually happened within the walls of the fraternity house.

With all his distaste for the grind of hard study, however, he was anything but an idler. He read a great deal. It was then, I think, that the influence of Zola began to exert itself. He read much, always of course in the original, and was an enthusiastic admirer of the French realist, refusing even to consider apology necessary for his frequent grossness. It is only in his later work, however, that Zola's influence can be seen. Norris scribbled quite a bit while in college for the college papers, and occasionally for the *Argonaut*. I doubt if he wrote anything of particular merit at that time—it was a time of whimsies when he would write his name with a "y," and of very evident imitation of Richard Harding Davis and of Kipling, in the order named. Exception should be made of his Junior Day farce, which showed effective handling of humorous situations, and especially of *Yvernelle*, his first ambitious work. *Yvernelle* was a long poem of mediæval love and chivalry in the style of Walter Scott, which was brought out in holiday form by Lippincott in 1892. It was the work, I think, of his freshman and sophomore years. To his friends it always seemed a great book, but it is a fact nevertheless that it had only a passing interest for the literary world, a circumstance which, let us hope, merely points to the obsolescence of its literary form.

I cannot now remember whether Norris had fully made up his mind to follow literature until after he left Berkeley in 1894. The succeeding year at Harvard, however, was given to earnest work with this purpose directly in view. He often spoke of the value of that year in teaching him the technique of his art.

What follows of his career is more or less matter of common knowledge. He went to South Africa in 1895 as a correspondent. After his return to San Francisco in '96 he began a literary apprenticeship of two years on *The Wave*, a San Francisco weekly that has since suspended

publication. He wrote many short stories, some of remarkable power. *Blix* and *A Man's Woman* are of this period. *Moran of the Lady Letty*, a vigorous sea-story, attracted the attention of certain New York publishers and through them Norris was sent to Cuba as a correspondent during the operations around Santiago. Then began a connection with the New York house that was but recently terminated. Hitherto he had only been learning his art and trying his powers, "flying kites," as he expressed it. *McTeague*, which appeared in March, 1899, was his first work of note and established his reputation at once as a novelist of the first rank. Its fidelity to detail and tremendous force are reproduced in *The Octopus*, his last published work, which shows, however, a greater refinement of style and an absence of the grossness often present in the earlier work.

A word with regard to his methods of work may be of interest. He was always gathering material and jotting down ideas in a little note book. In working up a theme, he made it a rule to get his impressions at first hand. In preparation for *The Octopus* he spent several weeks on Gaston Ashe's ranch in Monterey county. He interviewed C. P. Huntington, and the pen-picture of Shelgrim is the result. When his material was gathered, he worked continuously till his task was done. It was as if he were under the whip. An incident of a week I spent with him in New York in the holiday season of 1899 will illustrate this. We had spent the evening at the theatre and had supper afterwards and then a long chat till after midnight in his big bare room on Washington Square. About two I retired, but Norris, to my surprise, sat down at his table and wrote for another hour on *McTeague*, which was then literally seething in his brain. He said he had to get his ideas on paper.

I have made no effort to give a critical estimate of Frank Norris's work—that is for other pens. The purpose of this hurriedly prepared article has been to tell some things that only personal acquaintance would reveal. It is impossible

to give more than a faint idea of the personality of the man as his friends knew him. A surpassing personal charm, a ready wit, and a capacity for finding the joy of life—all these were his in full measure. He was always the same to his friends; he never used people as a means of advancing himself, and he never truckled or toadied to the powerful. He was simple and unaffected and always sincere to his friends and enemies alike, a strong friend and an open enemy. His death removes from American letters the most promising personality of recent years, and from among those who loved him a true friend and an "acquaintance tried."

H. M. WRIGHT, '94.

UNIVERSITY RECORD.

By Victor Henderson.

The bursting point has wellnigh been reached in the pressure of expanding numbers upon the meager building equipment of the University. This year's intrants, 817 in all, are more than twice as numerous as the freshmen of four years ago. The total number of students now enrolled in the colleges at Berkeley, 2483, is larger by one-fourth than at this time two years ago.

This continued expansion at the rate of about 12½ per cent. a year is the more surprising because admission has this fall been rendered more difficult than ever before. The class of limited students has been almost eliminated. The number of special students has been severely restricted. This year for the first time a tuition fee of ten dollars a term has been required of all students from states other than California. These limiting factors seem to have been offset by a notable rise in thoroughness of preparation as evidenced by the records offered by candidates of work done in the secondary schools.

This year the lecture-room and laboratory accommodations have been so far exceeded by the demand that it has been literally impossible to find upon the campus a place for all the classes set for certain hours. As a temporary expedient rooms were rented in Stiles Hall, a building not on the campus, whose ownership is vested not in the University but in an independent Board of Trustees. Here Professor

Winans meets his classes in public speaking; here, too, Professor Stephens conducts his freshman course in English History with its two hundred and seventy students, and Professor Setchell, his course in elementary botany with its three hundred and thirty-four students. There is no lecture room on the campus large enough to hold these classes.

Tables in the open air of a court of the Chemistry Building have been the only accommodations possible for a number of laboratory students. Several lecture classes in chemistry have made it a custom to sit on the porch and the stone steps at the northwest entrance of the Chemistry Building, rather than crowd into an insufficient lecture room.

A small addition to the Chemistry Building is now building to relieve the congestion and to afford a laboratory for the work in physical chemistry which is to be organized in January by Dr. Frederick G. Cottrell of the class of '97. Dr. Cottrell has just taken his doctor's degree in Leipzig, after completing an investigation which won the heartiest praises of Professor Van't Hoff and Professor Ostwald, the former declaring its author the most brilliant American student who had ever come under his instruction.

The fine stone President's House, which is rising on a knoll at the northern side of the University grounds, will be finished off into seminar rooms as a measure of relief. Here will be housed a few of those departments whose seminar libraries are of so technical a character that they can be withdrawn from the main Library Building without inconvenience to those not members of the seminar. Similar seminar rooms are to be provided in a temporary addition to the Library, of corrugated iron, for the use of other departments in which graduate work is emphasized, but whose books are of more or less general interest. This new equipment, though an unavoidable temporary blemish to the campus, will be of great assistance to University work.

The rising tide of books in the University Library,

which has flooded every nook and corner of garret and basement, will soon overflow into a new stack-room which is being added at the rear of the circular portion of the present building.

The building of patch-work additions serves only to relieve for the moment the most crying needs. Only the erection of permanent buildings can provide adequate facilities for the necessities and duties of the University.

THE HEARST MINING BUILDING.

The great excavation for the half-million dollar Mining Building, which Mrs. Hearst is erecting as a memorial to Senator Hearst, is a welcome earnest of what is to be.

The corner-stone will be laid in November with simple and impressive ceremonies. There will be an academic procession, hooded and gowned. Choral and orchestral music will be provided by the students. The men of the College of Mining will march in their laboratory uniforms,—blue jumpers and overalls, and miner's caps.

Already the excavation has been completed, covering an area of 181 by 227 feet, and the concrete foundations laid, and before the end of the year the steel frame-work will begin to rise. The building will be of granite from the quarries at Raymond, California. The stone is of great beauty and strength. The general plan, as drawn by Mr. John Galen Howard, Supervising Architect of the University, is that of a gridiron, with four interior courts to give light and air. "The exterior treatment," to quote Mr. Howard's own words, "is of an extremely simple, dignified character, based upon the classic tradition, but strongly influenced by the naïf and charming work of the Spanish Fathers in this land, and like that work depending largely for its effect upon the careful proportioning of its voids and solids and upon its low roofs of heavy terra cotta tile overhanging broad unornamented surfaces of wall."

The building will be adequate for all needs of the department for decades to come. It is so planned, however

that it can be indefinitely enlarged without sacrifice of symmetry or beauty. Moreover, the greatest elasticity will mark the interior plan. The frame work is of steel, the floors are wholly independent of the interior walls, and flues for furnaces, hoods, heating, and ventilation are provided in large number. In consequence any desired redistribution of space can be effected with a minimum of inconvenience and cost.

The chief entrance, in the center of the south façade, opens into the Memorial Vestibule and Museum, a lofty room, measuring forty by eighty-eight feet, rising through three stories, and surrounded by balconies at the level of the second and third floors. Light will come from three arched windows, seventeen feet broad by twenty-eight feet high, on the southern side, and from three circular domes, fifty feet above the floor. The room will be paved with marble and finished in buff pressed brick.

The administrative department, with public and private offices for the Dean, a reception room for visitors, and a room for records, will open at the west of the Memorial Vestibule. On the east will be a lecture room, and an office for the curator of the museum. At the north will rise marble stairways, in double flights, leading to right and left.

The general mining laboratory will open on the central axis, opposite the main entrance. It will be virtually a great central court, forty-six by one hundred and eighteen feet, open to the roof and lighted from above. A traveling crane will provide for the moving of heavy mining machinery. Broad galleries at the height of the first and second stories will serve as corridors and as vantage points for viewing mining operations.

In the east wing there will be metallurgical laboratories for juniors and seniors, in the west wing research laboratories, and in the central northern portion of the building a dry-crushing tower, three stories high. The tower will be flanked by two rooms, forty by sixty-two feet, one to be

used as a smelting room for copper and lead, the other for a gold and silver mill. On the second floor, opening from the gallery of the Memorial Vestibule, will be two lecture rooms, one forty by forty-two feet, the other twenty-four by forty-two, and a private study and drafting room for the Dean. On the third floor will be a library and stock-room, and attic rooms for drafting, photographic work and other purposes. Adjoining each lecture-room or laboratory will be a private study for the instructor.

In the basement there will be two large locker-rooms, each provided with shower-baths; forge rooms, heating and ventilating apparatus, a carpenter's shop, store-rooms and janitor's quarters.

An analysis of the motives expressed in the Mining Building is given by Mr. Howard in the October number of the *University of California Magazine*. It is in part as follows:

The aim has been to give expression to the character of a College of Mining Engineering as distinguished from one of Art, Letters, or of Natural Science. The expression of belles-lettres in architecture demands a more purely classic character than that of scientific studies. Such a building as a library, for instance, may without inconsistency rejoice in all the sumptuous glories of Roman architecture or the Renaissance; the tradition of the world leads one naturally enough in this direction. But the architect conceives that such delicate and highly organized motives find little place in a Mining Building, which demands a treatment, while no less beautiful, much more primitive, less elaborately developed in the matter of detail, less influenced by the extreme classic tradition either as a canon of proportion or as an architectonic schema. The profession of mining has to do with the very body and bone of the earth; its process is a ruthless assault upon the bowels of the world, a contest with the crudest and most rudimentary forces. There is about it something essentially elementary, something primordial; and its expression in architecture must, to be true, have something of the rude, the Cyclopean. The emotion roused must be a sense of power, rather than of grace. Even the scale of materials, the blocks of stone of which the walls are built, should be bolder and more strongly masculine than that of any other structure likely to find a place in a great University. To produce a design for a Mining Building which shall in all sincerity express its purpose and at the same time shall harmonize with future buildings quite as sincere in

the expression of their purposes—purposes in almost every case of greater amenity—this has been the aim of the architect in approaching his task in its artistic phase. If in its treatment he shall have secured a true outward and visible expression of the inward and spiritual organism of the building, and if at the same time he shall have succeeded in throwing over it a degree of charm which shall make it seem a kind, bluff brother amid a bevy of lovely sisters, he will feel that his efforts have not been wholly in vain.

THE SATHER GATEWAY.

Two other permanent improvements are to be put through at once,—the erection of the Sather Gateway, and the equipment of an open-air auditorium, by Mr. William R. Hearst.

Thanks to Mrs. Sather's gift of $10,000, an arched stone bridge will be thrown across Strawberry Creek at the Telegraph avenue entrance to the University grounds, and a monumental gateway built of stone and bronze. Thus will be created an entrance worthy of the future, a gateway as full of promise as the magician's portal in "The Alhambra."

THE HEARST AMPHITHEATRE.

Mr. Hearst's gift provides for the equipment of "Ben Weed's Amphitheatre" as an auditorium for great public occasions like Charter Day, Class Day, and Commencement, when throngs assemble too vast for any of the University buildings.

The natural hollow in the hills backing the University grounds on the east was chosen by the class of '94 as the scene for its Class Day extravaganza, the "Vehmgericht," and has ever since been used for the Class Day spectacle. The hollow is in natural contour almost exactly the shape of the ancient Greek theater. The ground will be left practically untouched. None of the overshadowing eucalyptus trees will be felled. The plans provide for a stage of large size topped by a concave openwork shell, with a lofty proscenium arch, flanked with standards for the University colors and the national flag. From left and right the

stage will be approached by trellised, vine-covered porticoes, with many standards for pennants. On the rising slopes of the amphitheater, benches will be provided for four thousand spectators.

Mr. Howard is at work on plans for other permanent buildings, in order that when funds become available there need be no delay in the beginning of work.

LIBRARY, ALUMNI HALL, AND FACULTY CLUB.

The greatest present needs of the University are a proper library and a proper library building. Mr. Howard has devised a plan for the library well adapted to present necessities and to future opportunities. He has planned a building which will consist essentially of four squares or blocks, each section to cost half a million. These could be built one or two at a time without detriment to art or to convenience. Similar squares could be added almost indefinitely, as future need might arise, without impairment of the design.

For an Alumni Hall, also, Mr. Howard is preparing plans. Nothing could be more potent for good in the inner life of the University than the early completion of this enterprise, to which the alumni have already pledged themselves. A building must be built at an expense of not less than $100,000 which shall serve as a student club, as a place for stimulating fellowship, as a mixing-bowl for the complex elements of the student life of to-day. Here in the Alumni Hall will be lounging rooms, reading and writing rooms, billiard rooms, a small assembly hall, a café, a barber shop, offices for the Associated Students, for various organizations, and for the college papers. Here will center undergraduate activities. Here faculty and students may meet together. Here returning alumni may pick up the threads of college life, and enter once more into intimate sympathy with their Alma Mater. Already a thousand dollars has been deposited with the Regents as the nucleus of the Alumni Hall Fund. Through the efforts of Mr. Charles S.

Greene, the retiring president of the alumni, several thousands more have been pledged. Mr. Frank Otis, '73, the new president of the alumni, has taken hold of the work with enthusiastic interest. The completion of this undertaking, which means so much for student unity and for all good things, surely cannot long be delayed.

The Faculty Club has now picturesquely housed itself among the oaks on the banks of Strawberry Creek.*

UNIVERSITY EXTENSION.

The new work in University Extension is meeting with a reception which proves how thoroughly this opportunity is appreciated by the State.

Professor H. Morse Stephens, who has come from Cornell to be Director of University Extension, has already organized centers at Marysville, Sacramento, San José, and Fresno, and in Southern California at Los Angeles, and Riverside. He will himself give a course of twelve fortnightly lectures at each of these centers. The courses will be planned to aid alike two classes of auditors — those who come for intellectual stimulation without any particular desire to undertake hard work, and those who wish to supplement the hearing of lectures by systematic study under trained direction.

It is expected that most people will come to these University Extension courses merely to listen to the lectures. For the more ambitious, study classes will be formed. At the close of each lecture Professor Stephens will spend an hour in consultation with these students, directing their reading and study, assigning themes to be written and conducting quizzes. At the conclusion of the course, students who have attended these quiz courses may take an examination for University credit.

Next year Professor Stephens will organize a number of other centers. From many communities appeals for University Extension courses have come which this year it

* A full account of the Faculty Club will be found above, pp. 196–207.

was not possible to meet. Next year, however, men will be appointed who will devote their entire time to University Extension work. From year to year new University Extension centers will be organized, and new lecturers called to the staff, until this unique opportunity will be within the reach of every California community. Courses will eventually be offered in history, literature, economics, art, music, agriculture, natural sciences, and in industrial subjects.

Professor Stephens is being aided by Mr. Jerome Barker Landfield, a graduate of Cornell, and for some years a graduate student there. From his familiarity with Professor Stephens's methods and aims, he will be of great assistance.

Through these University Extension courses many young men and women will undoubtedly acquire a taste for university work, and will be led to seek more adequate opportunities at the University itself.

THE BONNHEIM CONTEST.

Mr. Albert Bonnheim of Sacramento has offered to give $250 a year in prizes for the public discussion of some ethical question. The purpose is stated by himself as follows:

"It is not so much desired to obtain new facts or new truths in Ethics as it is to place the truths which we now have before as many students as possible, so that they may take greater interest in questions dealing with ethical problems."

A committee of the faculty consisting of Professor Gayley, Professor Bacon, and Professor Bakewell, drew up the rules for this year's competition as follows:

The competion is open to all undergraduate students of the colleges in Berkeley. It will be divided into two parts: the Dissertations and the Discussion.

1. *The Bonnheim Dissertations.*—Each candidate must deposit with the Recorder an essay upon the subject before Friday, November 14, 1902. The essay should not be signed. It must be marked on the title-page with a letter

and a number (such as *M. 25*) and accompanied by a sealed envelope bearing the same letter and number and containing the name and address of the writer. The essay must be typewritten, or written in a legible hand, on thesis paper of the regulation size as sold in the Coöperative Store. It should be preceded by an outline, should have accurate marginal references to sources and authorities, and should be followed by a bibliography.

No limit of length is prescribed; but terseness, clearness of statement, argumentative ability, scholarship, diction and form will be the points considered by the judges in making their decision.

The judges will announce the names of the five candidates who present the best Bonnheim Dissertations, and to each will be awarded a premium of ten dollars.

This announcement will be made November 21.

2. *The Bonnheim Discussion.*—The winners of the Bonnheim Premiums for dissertations shall be qualified to engage in the Discussion. This will be on the subject of the Dissertation, and will take place on Friday, December 5, in an auditorium to be announced later. Speakers may have fifteen minutes each.

The Bonnheim Prize of two hundred dollars will be awarded to the speaker who in the opinion of the judges makes the most comprehensive discussion and able presentation of the subject.

The committee has announced as the subject for the present year: Lynching and the Moral Law.

THE RHODES SCHOLARSHIPS.

The administration of the Rhodes Scholarships for American students has been discussed at the University of California with keen interest. President Wheeler's opinion as to the wisest terms for the award of the scholarships assigned to the American States and Territories was asked by Embassador Joseph H. Choate on behalf of the Rhodes Trustees. His reply was shaped after consultation with

many members of the University. The correspondence was as follows:

DEAR MR. PRESIDENT:—As you will remember, the late Right Honorable Cecil John Rhodes by his will provided for a large number of scholarships at the University of Oxford, and appropriated two of such scholarships, each of the yearly value of £300, to each State and Territory of the United States.

The Trustees under Mr. Rhodes' will are desirous of making regulations with regard to the method by which the qualifications of candidates are to be ascertained, and as to the examinations, and are seeking the advice of the principal official persons in each State and Territory, as suggested by the Testator.

They have also requested me to obtain for them the views of the heads of some of the leading Universities in the United States with regard generally to the election of qualifying students and the best mode of giving practical effect to the Scholarship Trust.

For this purpose they have intrusted me with printed copies of those portions of the will which relate to the scholarships, one of which I enclose. I hope that at your early convenience you will give the Trustees the benefit of your advice and suggestions in regard to this important matter.

You will observe that while two of the scholarships are appropriated to each of the States and Territories, the elections to scholarships are to be by the Trustees, who will, of course, be chiefly guided by the suggestions and directions of the Testator, but the scheme of the election or appointment of the scholars is largely within their discretion, as is also the scheme of the scholarships themselves, as to the grade and kind of studies to be pursued. In this connection one important question has already been much discussed, viz: whether the scholarships should be in whole or in part of a post-graduate grade, requiring applicants to offer something equivalent to a degree of A.B. from an American University.

I trust that the importance and interest of the subject will be the sufficient apology of the Trustees and myself for asking you to give to it your best consideration and so aid in making the munificent bequests of Mr. Rhodes as useful and as far reaching as possible. I have the honor to be,

Most truly yours,

JOSEPH H. CHOATE.

In answer to Mr. Choate's letter, President Wheeler wrote as follows:

MY DEAR MR. CHOATE:—In answer to the enquiry which you have privileged me in making regarding the assignment of the scholar-

ships provided by the will of the late Right Honorable Cecil Rhodes, I have, after conference with leading men of the University faculties, the following suggestions to make:

1. While Mr. Rhodes may have had in mind the appointment of boys merely prepared to enter the university, it is unmistakable that the adaptation of this basis of appointment to American conditions would involve serious, if not insurmountable difficulties. There are in nearly every state so large a number of high schools engaged in preparing students for the universities that no safe method of selection from among their students could be applied. If, as is likely, every school should have a candidate, the attitudes of the several principals of these schools would be that of advocates rather than of judges. The number of schools involved debars the suggestion of rotation among them. If a board of examiners should be created in each state to select from among the candidates of all the different schools, the tests would be perforce limited closely to the scholastic, as, in the absence of personal acquaintance, the qualifications suggested under headings ii, iii and iv of Mr. Rhodes's provisions could not be evenly and justly applied. The provisions point, indeed, almost of necessity to selections from a common body of men. This common body is found in the undergraduate life of the university itself, where the graduates of the different schools are assembled and tested through living and working together.

2. It was Mr. Rhodes's expressed intention in founding the American scholarships to draw together two English-speaking peoples by inspiring in those who share the benefits of these scholarships a sympathetic understanding of the life of the mother country, but without "withdrawing them or their sympathies from the land of their adoption or birth." It is my belief that this intention in its two clauses will be better fulfilled by the appointment of scholars of reasonably mature character such as is usually attained after some years of residence at a university than by the selection of boys who have never experienced American life as it exists at the American universities, and who by spending the most plastic period of their lives under the strong influences of a foreign society and by losing the attachments and interests incident to American college life, are likely to become, as experience in the case of young men receiving their earlier college training abroad most urgently warns, feeble vehicles for reaching American life under the purposes of the founder.

3. It was, again, no part of Mr. Rhodes's intention specially to forward research or advance professional training. The scholarships are not therefore to be intrepreted as a contribution to the cause of "graduate study" as commonly understood in America. If the graduate status should finally be appointed as the basis of selection, it could

only be on account of the two considerations referred to under the preceding headings 1 and 2.

4. As the average age of graduation in America is nearly twenty-three, the American scholars, in case graduates only are chosen, would be older than the English students commonly found in residence at the colleges. As college residence was evidently an important part in Mr. Rhodes's plan, the restriction of the scholarships to graduate students would, it is to be feared, tend to place the American students on a distinct and peculiar footing within the colleges not accordant with the purposes of the foundation. This leads me to the suggestion that the scholarships should be granted to *such as have at least completed the work of the Sophomore (second) year*, leaving open, at least for the present, the possibility of the selection in special cases of mature students. The completion of the Sophomore year marks, in most of our colleges, a well-defined frontier, whereat most of our students pass from their general or cultural work over to that more specialised work which looks toward ultimate concentration upon a professional specialty.

5. The choice of the scholars should be entrusted to certain selected universities, one or more in each State. In such States as have State universities (and the majority have) these universities would be naturally and appropriately selected. In States where two or more are named, as it would be evidently impracticable to select from a list of nominees on account of the lack, as in the case of High Schools, of a common basis of comparison, it would be a perfectly feasible arrangement to assign the scholarship to particular institutions by a system of rotation based upon the number of students in attendance at each.

6. In all the universities selected, candidacy for the scholarships should be limited to those students who in their prior education have, on the evidence of their credentials of studies and standing, satisfied at least the requirements of "Smalls." The test should not be postponed until the arrival of the appointees at Oxford; it should, however, be rigidly insisted upon.

7. The holding of the scholarships should be expressly limited to unmarried men.

8. The holding of the scholarships should also be limited to such as bear evidence, on physical examination, of possessing robust and perfect health.

Very sincerely yours,

BENJ. IDE WHEELER.

UNIVERSITY REPRESENTATION.

President Wheeler represented the University at the inauguration of Dr. Frank Strong, formerly President of the University of Oregon, as Chancellor of the University of Kansas, on October 19th; of President Edmund J. James, of Northwestern University, on October 21st; and of President Woodrow Wilson, of Princeton University, on October 25th. While in the East he will visit Washington on business connected with the relations of the University and the National Government in matters of military and agricultural education. The forestry and irrigation interests of California will also engage his attention. Various matters are also to be looked after with reference to the expansion of the University faculty and the development of different departments.

Professor Edward B. Clapp, head of the department of Greek, represented the University at the three hundredth anniversary of the founding of the Bodleian Library, at Oxford University, on October 8th and 9th.

Dr. Max Uhle, Hearst Lecturer in Peruvian Archaeology, Dr. Alfred L. Kroeber, Instructor in Anthropology, and Mrs. Zelia Nuttall, a member of the Advisory Committee of the Department of Anthropology, represented the University at the International Congress of Americanists in New York, beginning October 20th.

Professor Myer E. Jaffa represented the University at the convention of the Association of Official Agricultural Chemists in Washington, D.C., October 2nd to 4th, and at the convention of the Association of American Agricultural Colleges and Experiment Stations at Atlanta, Georgia, beginning October 7th.

The degree of LL. D. was recently conferred upon Professor Bernard Moses by the University of Michigan, and the degree of Sc.D. upon Professor S. B. Christy at the last commencement of Columbia University. In presenting Professor Christy for the degree, Professor Walter Monroe, Dean of the College of Mining of Columbia University, said:

Professor Christy, you have now been connected with the University of California for over thirty years, as student, as assistant, as instructor and as professor. During this period you have distinguished yourself not only as an educator, but in addition to the very onerous and exacting duties of your professional work, you have conducted elaborate investigations in chemical geology and chemical physics in connection with your studies of the origin of metalliferous deposits and in your researches into the fundamental laws governing certain metallurgical operations.

As a result of this work you are recognized as a scientific student of distinguished ability, not only by your colleagues on the Pacific Coast, but here and on the other side of the Atlantic and indeed, throughout the world, wherever like problems demand solution.

We honor you to-day, not alone for these scientific achievements, but above all for your earnest efforts for the sound education of the young engineers committed to your charge. You have now been responsible for the development and conduct of the College of Mining of the University of California for over two decades. In this work you have succeeded where able men have failed, and from small beginnings, from a school with less than a score of students, the College of Mining, under your care and guidance, has grown to be one of the largest and most flourishing institutions of the kind in the world. In this work you have enlisted the hearty support of the mining men of California; they have cordially seconded your efforts, and opened their mines and metallurgical works to you and to your students; they have shown their confidence in you by sending their sons to your institution in ever increasing numbers, to be trained by you for their life-work. The State authorities have again and again increased your equipment and facilities for instruction, and now, by private munificence, the foundations are being laid for an imposing structure, to be committed to your care, and devoted solely to instruction in mining and metallurgy.

As a result of your efforts, we of the old Columbia School of Mines recognize your College of Mining as our most formidable competitor. There is, however, no real competition or rivalry, and certainly no jealousy between us. We are working for a common object, and there is room for both institutions and for many more in this imperial land of ours. As colleagues, then, we greet you, and congratulate you on your well-deserved success, and we feel that we do ourselves honor in honoring you.

FACULTY CHANGES.

The College of Commerce is rapidly growing in number of students. In recognition of its expanding needs the

Department of Political Economy and Commerce has been separated from the Department of History, and Professor Adolph C. Miller, Professor Carl C. Plehn, Mr. Lincoln Hutchinson and Dr. Ernest C. Moore constituted as its staff. The faculty of the department is to be enlarged and strengthened.

Dr. Wesley Clair Mitchell has been appointed Assistant Professor of Commerce. Dr. Mitchell received the degree of A. B. from the University of Chicago in 1896, was Fellow in Political Economy in 1896–97; Armour-Crane travelling fellow from 1897 to 1899; after a year at Halle and Vienna he returned to Chicago, and he took his doctor's degree in 1899. Since 1899 he has been in the Department of Political Economy at Chicago.

Mr. E. W. Major, a native of the Island of Jersey, a graduate of the University of Minnesota, and for some years a valued member of its staff in animal industry, has been called to the University as Instructor in Dairy Husbandry. Mr. Major has had varied experience in the practical management of the herd and in dairy research and instruction. His first task upon his arrival at Berkeley was the organization of the ten-weeks' course in dairying. Under his direction twenty-six students have engaged in the making of butter and cheese in the well-equipped dairy workroom in the basement of the Agricultural Building.

Dr. Elmer E. Hall, B.S., University of Southern California, '93; M.S., California, '96, and Ph.D., Cornell, '02, has returned to Berkeley as Instructor in Physics. Dr. Hall's researches during his graduate years at Ithaca won him the highest praises from members of the Cornell faculty of physics.

Dr. Augustus Valentine Saph, B.S., '94, M.S., '96, and Ph.D., Cornell, '02, formerly Instructor in Drawing, has returned to Berkeley as Instructor in Civil Engineering. Dr. Saph's investigations while in the East were primarily in the field of hydraulics. The results of his important researches in this subject were published in the Transac-

tions of the American Society of Civil Engineers in April, 1902. He will offer courses in structural engineering and field work.

Mr. Arthur B. Smith, Ph.B., Wesleyan, 1900, and Mr. H. Ralph Mead, Ph.B., Cornell, 1899, have been appointed assistants in the Library. Mr. Smith was for three years student librarian of the Genesee Wesleyan Seminary, for three years librarian's assistant at Wesleyan University, for a year student assistant in the library of the University of Illinois, and in 1902 he graduated from the Illinois Library School. Mr. Mead took his master's degree at Cornell in 1900, and since then has been in the catalogue department of the Cornell University Library.

Mr. Arthur Nahl, Assistant in Mining throughout the past year, has resigned to accept a mining position in Mexico. He has been succeeded by Mr. Charles T. Dozier, who graduated from the University last spring, and who was Senior President of his class.

Miss Alice Robertson, who received the degree of Ph.D. last May after four years of graduate study in zoology, has been appointed Assistant in Hygiene. She will aid Dr. Mary B. Ritter in her courses for women. Dr. Robertson's thesis is to be printed as one of the University's publications in Zoölogy. A paper by Mr. Harry B. Torrey on "The Hydroida of the Pacific Coast of North America, with Especial Reference to the Species in the Collection of the University of California," is to be the first number of the new Zoölogical Bulletins.

DR. REISNER'S LECTURES ON EGYPT.

Two courses of anthropological lectures, open to the public and largely attended, were offered at the University during September through arrangements made by Mrs. Hearst.

Dr. George A. Reisner, who for three years has directed the work of the Hearst Egyptian Expedition, came from Egypt at the end of August and spent some weeks in con-

sultation with Mrs. Hearst, President Wheeler, and other members of the University in regard to his future plans. During his stay Dr. Reisner gave five lectures at the University which were largely attended.

Dr. Reisner told in detail of the work which the University has accomplished in Egypt. He illustrated his descriptions with photographs from the remarkably full series with which every step in his work has been recorded. Never before in the history of cemetery excavation in Egypt have photographic records of such completeness and scientific accuracy been secured. Of the rich store of Egyptian antiquities now accumulated by the University, ninety-five per cent. are accompanied by photographs showing the object *in situ*. For not more than five per cent. of the Egyptian antiquities in the British Museum do similar photographs exist. The importance of such evidence in the discussion of Egyptological problems is apparent.

Dr. Reisner's lectures were as follows:

September 2, "Introduction. The prehistoric cemeteries of Ballâs, El-Ahaiwah, and Naga-ed-Dêr (4000–3500 B.C.)" September 3, "The cemeteries of the first five dynasties at Naga-ed-Dêr (3500–2500 B. C.)" September 8, "The cemeteries of the sixth to the tenth dynasties at Naga-ed-Dêr (2500–2000 B.C.)" September 10, "The palaces and the houses of the Middle Empire at Dêr-el-Ballâs (2000–1500 B.C.)" September 12, "The cemeteries and the houses of the New Empire at Dêr-el-Ballâs and El-Ahaiwah (1500–500 B.C.)"

After completing his lectures, Dr. Reisner was for some days Mrs. Hearst's guest at the Hacienda del Pozo de Verona. A historic "Egyptian dinner" was given in honor of Dr. and Mrs. Reisner by their hostess. Dr. Reisner has now returned to Egypt to resume his work of excavation.

THE CLIFF DWELLERS.

Mr. George H. Pepper of the Division of the Southwest of the American Museum of Natural History of New York,

gave three illustrated lectures at the University on "The Cliff Dwellers." He described in elaborate detail the results achieved by the Hyde expeditions to New Mexico, Colorado, Utah and Arizona. Mr. Pepper's lectures were as follows: September 23, "The Aesthetic Arts of Pueblo Buenito, Chaco Cañon, New Mexico. The Pueblo Culture at its Zenith." September 25, "The Home Life and Arts of the Self-sustaining People—the Navajo Indians of New Mexico." September 29, "The Cliff Dwellers and Basket Makers of Utah and Arizona."

PHILOSOPHICAL UNION.

Robert Mark Wenley, Ph.D., Sc.D., Professor of Philosophy in the University of Michigan, delivered the annual public address before the Philosophical Union Friday evening, August 29. Professor Wenley's subject was "The Affinity of Plato's Republic for Modern Thought." George Herbert Palmer, LL.D., Alford Professor of Natural Religion, Moral Philosophy and Civil Polity in Harvard University, will deliver the annual address before the Union next August. Professor Palmer's book, "The Field of Ethics," is the basis of the studies of the Philosophical Union for the current year. A change has now been made in the constitution of the Union whereby undergraduates may enjoy the privileges of membership. The Union meets on the last Friday evening of each month throughout the academic year. Dr. W. P. Montague spoke on September 26 on "Ethics as a Normative Science." The programme for the remainder of the year is as follows:

October 31, "Ethics and the Philosophical Sciences," Professor C. H. Rieber of Stanford University, A.B., California, '88; November 21, "Ethics and Economics," Professor Carl C. Plehn; December 19, "Ethics and the Law," Mr. Alex. G. Eells, '86; January 30, "Ethics and Aesthetics," Mr. Charles A. Keeler, '93; February 27, "Ethics and Aesthetics," Professor C. M. Bakewell, '89; March 27,

"The Field of Ethics Determined," Professor Howison; April 24, "Ethics and Religion: their Divergences," Mr. H. A. Overstreet, '99; May 11, "Ethics and Religion: their Affinities," Rev. Charles R. Brown of the First Congregational Church, Oakland.

UNIVERSITY MEETINGS.

The year began with a meeting in the Harmon Gymnasium at ten o'clock on the morning of Monday, August 18. President Wheeler's welcome to the freshmen and to the returning throngs of students is printed elsewhere in this number. The speakers at the subsequent University Meetings were as follows: August 29, Professor Wenley of the University of Michigan, and Hon. John P. Irish, of San Francisco; September 12, Dr. Jacob Voorsanger, Professor of the Semitic Languages and Literatures and Rabbi of Temple Emanu-El, and the late Frank Norris, '94; September 26, Mr. Fairfax H. Wheelan, President of the San Francisco University Club, and Mr. Frank Otis, '73, President of the Alumni Association; October 10, Mr. H. Weinstock of Sacramento, author of "Jesus the Jew" and founder of the Barbara Weinstock lectureship on "The Morals of Trade," and Professor Max Farrand, head of the department of history of Stanford University.

A BUST OF PROFESSOR LECONTE.

Mr. Lafayette H. DeFriese, '75, recently sent to President Wheeler fifty dollars as his contribution toward the purchase of a bust of Professor Joseph LeConte for the University Library. A committe headed by Professor Jones hopes soon to complete the fund.

PRESSING UNIVERSITY NEEDS.

A discussion of the growth of the University during the past two years and of its outlook for the future will be found in President Wheeler's biennial report to the Governor on behalf of the Regents, which will come from the

University Press at the end of November. Those needs which are most imperative were set forth by President Wheeler in an article in the October number of *Sunset*, together with an account of significant elements in the recent progress of the University. President Wheeler's statement was in part as follows:

"At the earliest possible opportunity there should be established a school of forestry. Trained foresters are much in demand. Students are ready to enter on the work. $10,000 is needed for the first year, $15,000 the second, $20,000 the third. A university farm with full equipment of dairy barns and stock and the entire outfit competent to illustrate all the usual agricultural processes must be provided forthwith. A library building is the greatest of all present needs. Plans are in preparation, and in one way or another the building must and will be built. A beginning must be made next year. Though it can be built in sections, its total scheme must be planned at a prospective cost of not less than a million and a half dollars. We must have shortly a school of naval architecture and engineering, and one of art and architecture. The department of education needs a model school as a laboratory ($30,000 for building, $15,000 for annual maintenance). Music, the most progressive of all the arts, is totally unrepresented in the present equipment of the university; we need $150,000 for building, $10,000 to $20,000 per year for maintenance. Pressing needs are a physical laboratory ($250,000), buildings for botany ($125,000), geology ($125,000), and an auditorium ($200,000).

"A museum of anthropology and art adapted to house the rich collections already accumulated and still accumulating under the munificent provisions of Mrs. Hearst's generosity ought not, and I believe will not, wait long for its realization. A university hospital connected with the medical school is essential to the development of such a standard of medical education as shall rescue our California students from the necessity of seeking their training in

Europe or on the Atlantic seaboard. A students' infirmary at Berkeley would cost $50,000 to $75,000; for its annual maintenance $5000 to $10,000 would suffice. Some one will soon realize the good he can do for others and the blessing he can get for himself in providing this. Individual departments of university study may well attract the patronage and support of individual benefactors after the pattern of Mr. D. O. Mills's foundation of the chair of philosophy and his additional provision of $50,000 for the endownent of the department, of Mr. Edward Tompkins's endowment of the chair of Oriental languages, of Mrs. Jane K. Sather's endowment of a chair in classics. In view of the opportunities and responsibilities opened by the peculiar location of this university, the Department of Oriental Languages appeals to attention. The state cannot be expected to give it proper support. It ought to have an endowment of $300,000. The Semitic department should have the same.

"It needs $80,000 to $100,000 to endow a professorship; $10,000 to endow a department in the University Library; $10,000 to endow a fellowship. The endowment of a library department means that that department (chemistry, Latin, mining, botany, etc.), will have $500 each year for the purchase of new books, and that on an average 250 volumes a year through all the years will be added to a collection which will rise as a monument to commemorate the gift and as a lighthouse to guide and help mankind. The endowment of a fellowship will mean each year through all the years the opportunity for a graduate student to pursue research or prepare himself for service in a specialty.

"The outlook of the University is large. It is advancing into the field of its outlook with strong, sure steps. Nowhere can money be applied with such assurance of permanent usefulness as in a university endowment. Out of the fortune of Michael Reese $50,000 came to the University Library. We know the good that has done. What has become of all the rest? Does any one doubt the wisdom to-day of James Lick's endowment of the observatory?"

STUDENT AFFAIRS.

By W. T. HALE and A. C. SKAIFE.

The opening of the present year at the University has been marked by an increase of the Associated Students' control over student affairs and by a tendency to increase the scope of student control of student affairs. The Debating Committee of the Associated Students has already this year used its enhanced power in the complete direction of the Freshman-Sophomore Debate, and further, at the suggestion of President Wheeler, the Associated Students, through its president, directed the organisation of the Freshman Class.

But the greatest increase in the scope of student self-government has been the inauguration and the proposed extension of student control of student conduct. The discussion of student control has been prominent lately in student circles owing to the failure of the movement for an "honor system" and to the fact that certain severe measures were taken by the faculty for the suppression of hazing and infractions of military discipline. Early in the term a committee of the Associated Students was appointed to suggest measures looking toward a system of student control. The work of this committee was made more important by the unfortunate affair of September 24, when an excess of enthusiasm at a football rally broke forth into rowdyism. A party of students boarded a train and proceeded to do considerable damage which the officials were unable to prevent. This thoughtless rowdy conduct, though not

malicious, brought a storm of newspaper condemnation, together with newspaper exaggeration. The affair over, no one regretted it more than the participants, and at the University Meeting two days later resolutions were passed deploring the misconduct and promising to make good the damage. Money was afterwards raised, all claims paid, and serious results other than to the reputation of the University avoided. This matter was successfully handled by a committee of the Associated Students, and encouraged by this, the committee on student control recommended to the executive committee of the Associated Students on October 14, that the Academic Senate be requested to add five student members to the Committee on Student Affairs, this being deemed as radical a step toward student self-government as is feasible at present.

The University Meetings of the present term have been largely attended and great enthusiasm manifested. Their influence toward developing a healthy University spirit is very marked. Several enthusiastic football rallies have also aided in stimulating the *esprit de corps*.

The senior class at the beginning of the term found itself burdened with a debt of $600 incurred in the publication of its elaborate *Blue and Gold*. This debt was cleared by a successful society vaudeville given under the auspices of the class September 26. The class has decided to proceed with its plan of endowing a '03 scholarship, and deserves credit for efforts to revive the custom of senior singing.

Four members of the senior class have been elected members of the Phi Beta Kappa: Miss S. Kurlandzik, Miss E. B. Leale, Miss E. McGrew and Mr. A. B. Weiler.

The junior class is preparing for the Junior Day celebration which takes place on November 28 and will follow traditional lines.

The editor of the *Blue and Gold* having resigned, the

publication of the book has been placed in the hands of a board of three members, of which Mr. A. L. Price is chairman. Numerous prizes for literary and artistic work have been offered and an assessment of five dollars each has been levied on members of the class, so that an excellent volume is assured.

The activities of the sophomore class have not been noteworthy. The class hop has been postponed until next term. The class indebtedness to the University remains unpaid.

The Sophomore-Freshman Debate is to be held October 31.

Under the able coaching of James R. Whipple, ex-00, and L. A. Womble, '02, strong freshman and 'varsity football teams have been trained. The latter, composed chiefly of veterans, is now in excellent shape to meet Stanford in the big game on November 8. It has played the following games: September 26, California 12, Alumni, 0; October 4, California 16, Reliance 0; October 11, California 44, Alumni 0; October 25, California 17, Reliance 0. The freshman team has developed excellent team work as well as a number of very promising individual players. They crowned a successful season on October 1 by beating the Stanford freshmen 12–0 in a fine cleanly-played contest. Their record is as follows: September 16, Freshmen 5, Berkeley High School 0; September 20, Freshmen 0, Santa Clara College 0; September 24, Freshmen 11, St. Matthew's School 0; September 30, Freshmen 16, Berkeley High School 5; October 4, Freshman 22, Oakland High School 0; October 9, Freshman 40, Peerless 0; October 11, Freshmen 23, Hoitt's School 0; October 18, Freshman 12, Stanford Freshmen 0.

The eastern trip of the Track Team was not eminently successful. It made a fair showing at the Intercollegiate and beat Princeton, but was defeated by Yale and Chicago. The team went east in a year of exceptional performances

and met with many mishaps and hindrances, but they worked faithfully and upheld the good name of California among our sister universities of the East, and the trip did not leave the management in debt.

In point of victories the trip of the baseball team was more successful. The team won twenty-four out of twenty-eight games, and gained, besides, much valuable experience. The interclass baseball series was won by the sophomore team.

The Boating Association has been reorganized under a new constitution, the membership has increased, new equipment has been added, and the services of a professional coach secured. Numerous aquatic events have been arranged and considerable interest is displayed in spite of the natural obstacles in the way of rowing.

The Sports and Pastimes Association, which embraces all the athletic organizations of the women students, has been active along several lines. A number of basket-ball games have been played, and for the first time a limited number of men were admitted to one on October 18. A tennis tournament has been held and a match with Stanford is being arranged.

The chief event in debating this term is the contest for the Bonnheim prize of $200, on the subject, *Lynching and the Moral Law*, to be held December 5. A freshman debating society has been organized and the sophomore society revived. The Freshman-Sophomore debate will be held November 21, the general subject being "Coeducation." A society called "The Wranglers" has been formed, consisting chiefly of those who have been members of intercollegiate debating teams.

The various student publications have been continued this year along the same lines as usual. The *Californian*, now devoted almost entirely to daily news, shows careless-

ness both in matter and proof-reading. Recent issues, however, show signs of improvement. The *Occident* follows the even tenor of its way with little change except for an occasional controversy. The *Magazine* shows renewed vigor this year, especially in its alumni department.

The Art Association has given two excellent concerts this term. The Choral Society and the University Orchestra are doing good work.

The reorganization of the Glee, Mandolin, Banjo and Guitar Clubs has marked a step in advance. Greater care in the selection and training of candidates has raised the standard and they have shown a praiseworthy spirit in offering their services at the rallies and University Meetings. They are planning an extended Christmas trip.

One new fraternity, Psi Upsilon, previously organized as Alpha Psi, was installed this term, and is housed in commodious quarters on Ridge Road; and a new sorority, Chi Omega, has been added to the list.

The College of Commerce Club, the Philosophical Union, the Mining Association, and the Association of Electrical and Mechanical Engineers have held profitable meetings. On similar lines have been organized a Harvey Biological Club, a Chemistry Association, a Civil Engineering Association, an Agricultural Association, a Graduate Court of Law Club and an Italian Club.